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Telephony®

THE JOURNAL OF THE TELEPHONE INDUSTRY

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Guaranteed Circulation This Issue
15,594 of Which 12,955 Is Paid

SPRING CONSTRUCTION — RURAL ISSUE

2 HEADS BETTER THAN 1

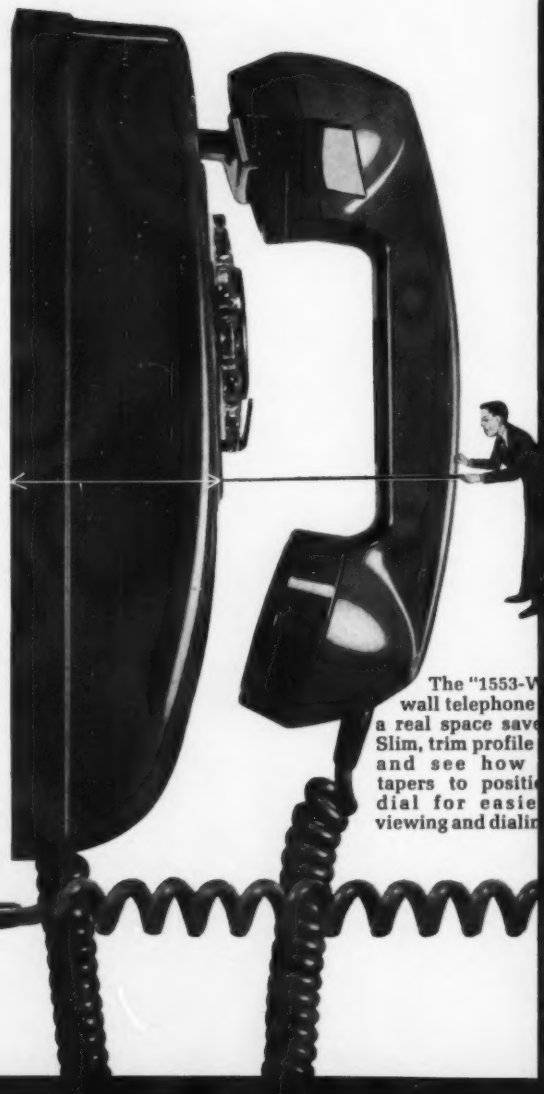
Results of recent "double dome" research into ways people locate direction of sound by Bell Telephone Laboratories, may be improvement of stereophonic radio, TV programs, transmitted over telephone facilities. **See p. 58.**

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

Sure-grip chrome cradle holds the handset firmly in place. And there's a special recessed ledge on top of the housing to hold the handset for off-hook operation. No need to let handset and cord dangle!

these are phones...

Beautifully contoured housing is easily removed by loosening one recessed front-mounted screw.



Test the new handset! Mouth-to-ear distance is exactly right for maximum gain. Feather-light, too, so it's more comfortable to hold.

The "1553-W wall telephone a real space save Slim, trim profile and see how tapers to positi dial for easie viewing and dialin

Stromberg-Carlson exclusive: tapered finger holes make dialing smoother, easier!

the

with the features subscribers want!

Note the letter-and-number arrangement. Most accepted style, easy to read. Dialing is easy, too—fast, smooth and quiet.

Stromberg-Carlson 1543-W desk set...1553-W wall phone

Desk and wall models are available in a wide selection of decorator colors perfect for matching, blending or contrasting. Full-range performance, full range of colors, plus all the other superior features of these telephones make them sure-fire subscriber pleasers! So get your share of profitable revenue with these 1543-W and 1553-W phones by Stromberg-Carlson. Your nearest Stromberg-Carlson representative is standing by with full details, prices and colorful selling aids. In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

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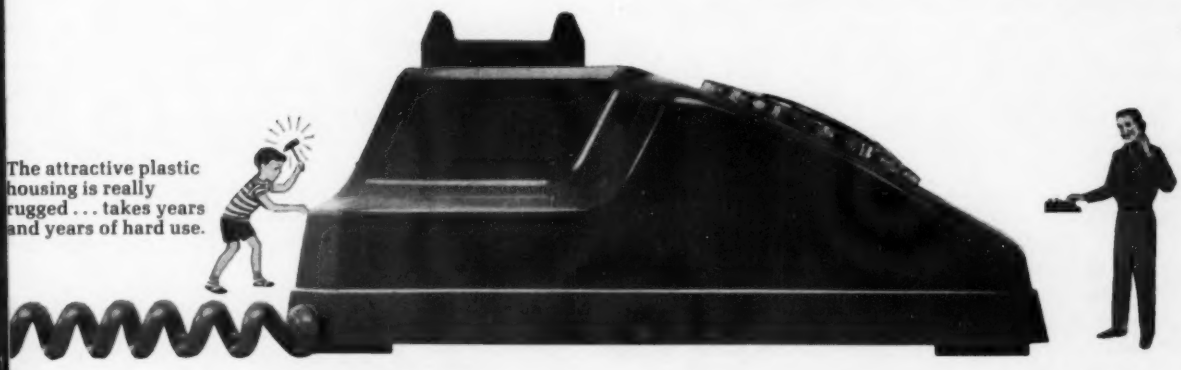
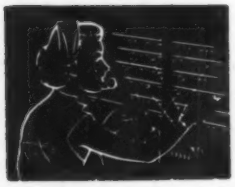
A DIVISION OF **GENERAL DYNAMICS**



The attractive plastic housing is really rugged . . . takes years and years of hard use.

Transmission and reception quality are natural, lifelike . . . equals or exceeds the highest standards for the industry.



FLASHES AND PLUGS

VELLY FLINE CONFLENCE. When the receptionist telephones from the lobby desk that there is a foreign visitor on hand, who wants to get acquainted and observe operations, something like this could happen.

The fictional situation occurred in the offices of Nationwide Insurance Co., Columbus, Ohio, and was reported in the March-April issue of the company publication, *Nationwide World.*

In this particular instance, the visitor was oriental. Difficulties of communication occurred as follows:

"I believe you're interested in getting acquainted with the organization and operation of mutual insurance companies."
"Mao tze tung? Fu manchu? Chiang kai-shek?"
"Oh, certainly. We check all applicants very carefully. We're a select risk company."
"Liti—liti—yess. Fuyong."
"There's a real problem. We insure quite a few young drivers, but we have to charge them higher rates."
"Kyoto?"
"Yes, that's our main line. We're the second largest in terms of auto premium."
"Senk you, pliz. No tientsin suey?"
"Well, yes. Now and then a chap will take us to court."
"Hangkow?"
"N-no, I don't think so. We insure a good many cattle, but we don't ever send one to the gallows." . . .
"Shanghai wenchow."
"We usually eat about 12."
"Pusan seoul wuchang kochi."
"By all means. We'll have one at rest period."
"Hsiang yalu kaifing chengkou."
"Don't mention it."
"Kumamoto wuhsi."
"Frankly, I am too."

•

MERELY THE MIDDLEMAN. An assessor's wife in Buffalo, N. Y. received a telephone call from a man who threatened to shoot the assessor through the head after the city announced new assessments.

The wife asked, "Do you think that would reduce your assessment?"

The caller paused and just before hanging up, said, "I hadn't thought of that."

•

REPLY THAT STAGGERED THE CALLER. The Associated Press reports that in San Diego, Cal., a Navy chaplain named Lt. Daniel Litt was at the 11th Naval District headquarters when a telephone call came for another chaplain.

In the absence of the chaplain called for, the secretary responded to the request, saying, "We have only one chaplain here just now, and he is Litt."

There was a pause, and what seemed an embarrassed silence. Then, the caller hung up.

CHANGE OF ADDRESS

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

April 23, 1960

CONTENTS

IN THE NATION'S CAPITAL 17
By Francis X. Welch

ABC OF THE TELEPHONE—PART 94 19
By Frank E. Lee

THE FIRST INDEPENDENT WITH CBCD 24
By C. J. Williams Jr.

THE POTENTIAL MARKET FOR TELEPHONE ANSWERING DEVICES IN THE SERVICE INDUSTRIES—PART 8 30
By Alexander I. Warrington

T.O.P. TOPICS . . . GET THE MOST FOR YOUR MONEY 36
By Winnie B. Burnett

TROUBLE CLEARING, IF ONLY I HAD KEPT A RECORD 38
By L. N. Martin

THE PLANT MAN'S NOTEBOOK 40
By Ray Blain

PLANT MAN'S QUIZ 42
By Ray Blain

ROLLING TEST STAND FOR CARRIER MAINTENANCE 48
By D. G. Plaskett

THE OPERATOR'S CORNER 50
By Mayme Workman

EIGHT REA LOANS, TOTALING $3,158,000 AUTHORIZED 64

COURTS AND COMMISSIONS 72

NEWS ON NEW PRODUCTS 90

MISSISSIPPI MEET REPORTS STATE'S INDUSTRIAL STRIDES 106
By J. H. Creekmore

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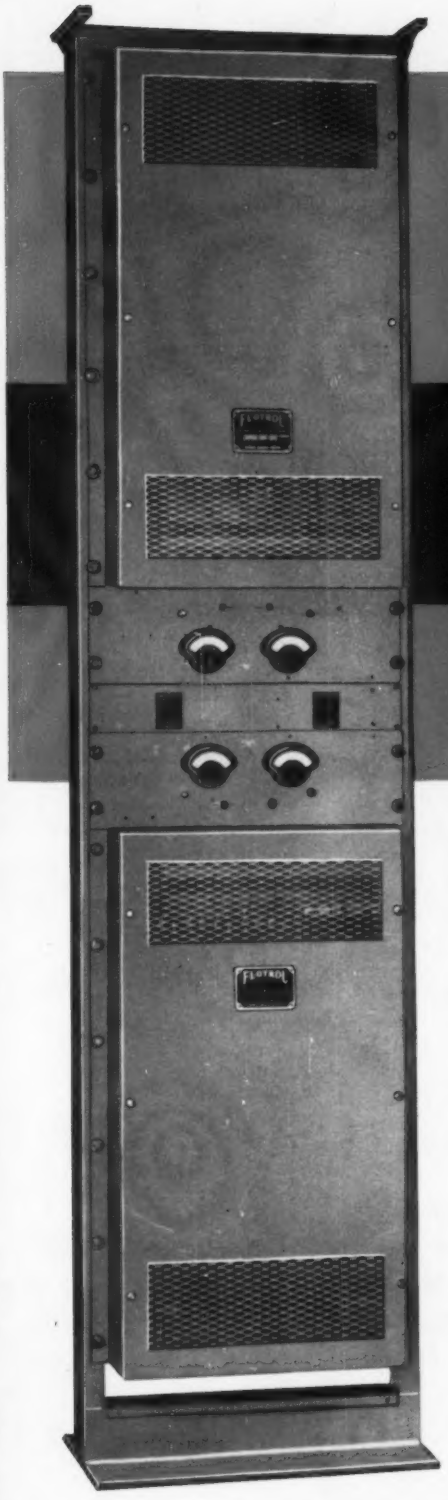

2 in the space of 1

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DUAL

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TWO STANDARD FLOTROL CHARGERS TEAMED TOGETHER FOR THE UTMOST IN FLEXIBILITY, SAFETY, COMPACTNESS

You get standby peak capacity or additional operating capacity — without using additional costly floor space!

The Lorain Dual Flotrol Battery Charger Assembly consists of two complete Flotrols mounted one above the other in a standard 23″ relay rack. The upper unit is inverted to bring all meters and controls to eye level, along with easy-access input and output leads. Total floor space: 24-3/8″ x 15″.

The two chargers can be used either individually, or continuously in parallel. In addition, an automatic control panel (optional) allows either Flotrol to be selected as the primary charger with the second unit automatically operated in response to load demands exceeding the capacity of the primary charger.

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Automatic proportional sharing of the load when operating in parallel is available on most of the 14 models.

Single-phase Duals offer a range of outputs from 24 to 48 amps. (input 230 or 115 volts, 60 cycles). Three-phase Duals cover 50 to 100 amps. Capacity of a Dual unit of less than maximum rating can be increased at any future time by substituting a larger Flotrol for either unit.

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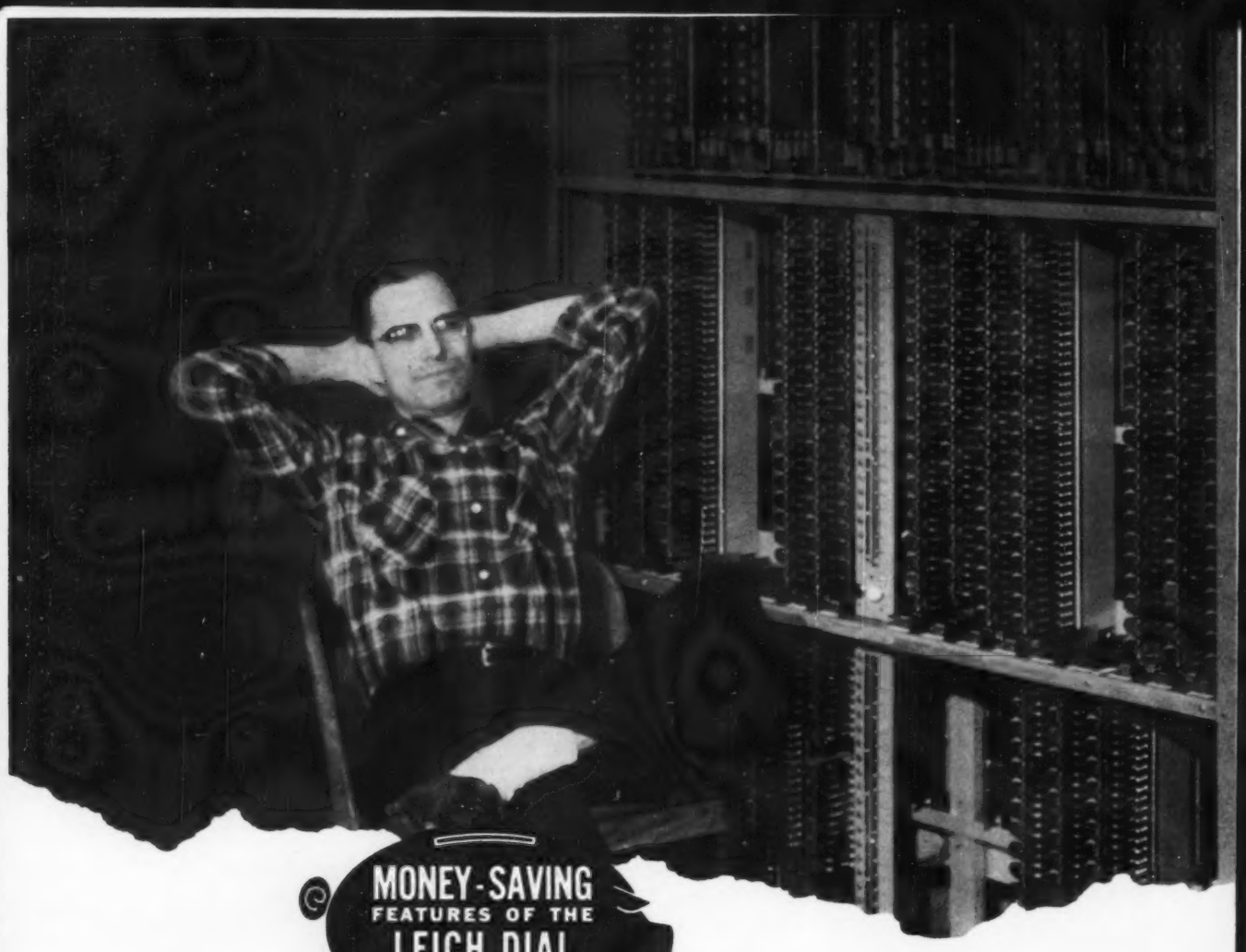

MONEY-SAVING
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Reduces Maintenance b

Because the Leich TPL and TPS Dial Systems are all-relay, your maintenance costs are reduced to the minimum. There's simply less to go wrong. The Leich Dial System eliminates mechanical switching mechanisms which are apt to wear and require maintenance.

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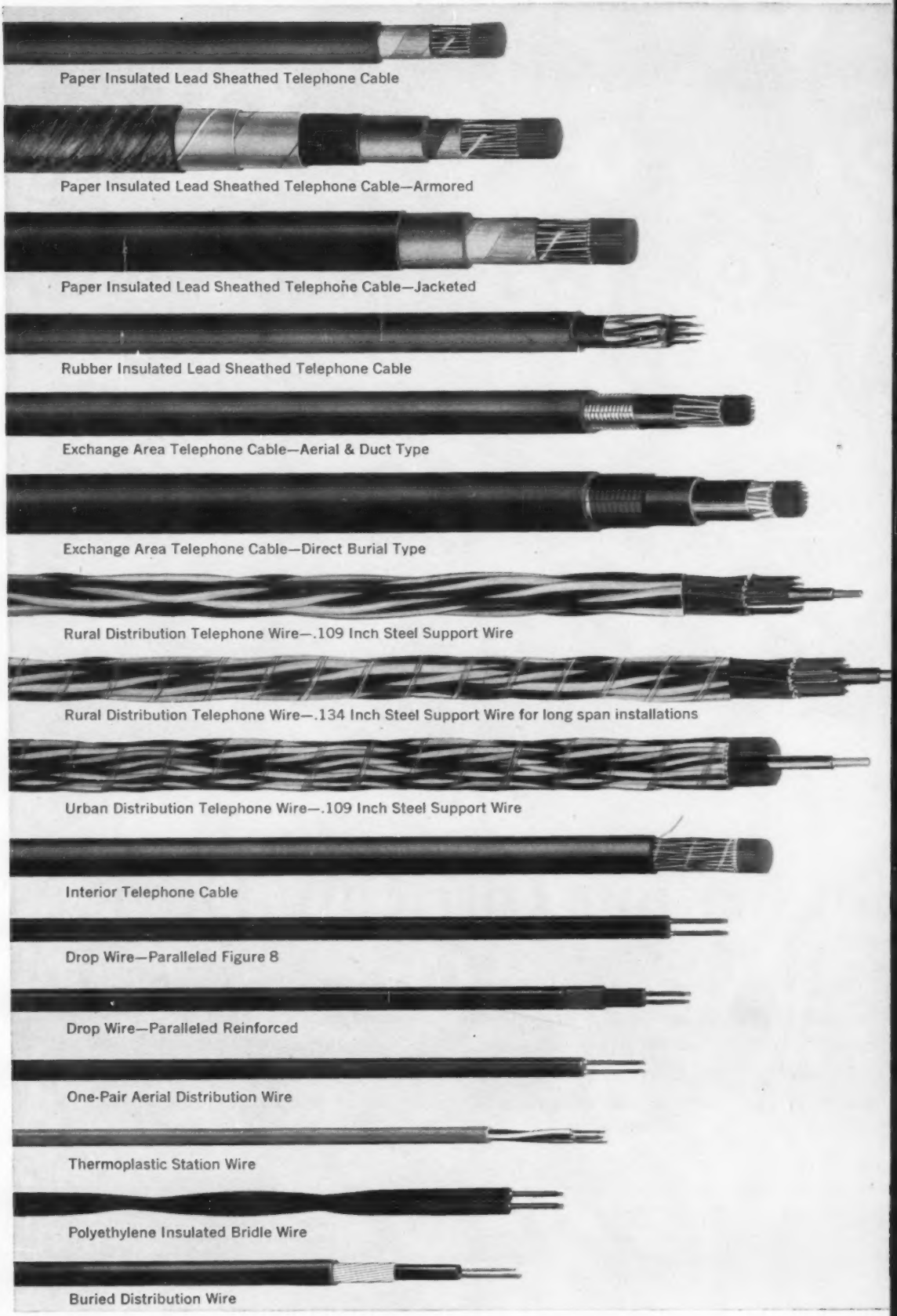
nufacturers of telephones, switchboards and related apparatus since 1907



Paper Insulated Lead Sheathed Telephone Cable

Paper Insulated Lead Sheathed Telephone Cable—Armored

Paper Insulated Lead Sheathed Telephone Cable—Jacketed

Rubber Insulated Lead Sheathed Telephone Cable

Exchange Area Telephone Cable—Aerial & Duct Type

Exchange Area Telephone Cable—Direct Burial Type

Rural Distribution Telephone Wire—.109 Inch Steel Support Wire

Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations

Urban Distribution Telephone Wire—.109 Inch Steel Support Wire

Interior Telephone Cable

Drop Wire—Paralleled Figure 8

Drop Wire—Paralleled Reinforced

One-Pair Aerial Distribution Wire

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FOR PRODUCT DEPENDABILITY . . . SPECIFY

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Behind the rugged dependability and high quality of Phelps Dodge telephone wire and cable are years of experience and research in the design and manufacture of communication cables.

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YES—Person-to-Person, Third number and Collect calls can be handled with this tremendous savings in operating expense—and all that negligible cost!

The important thing to note is:

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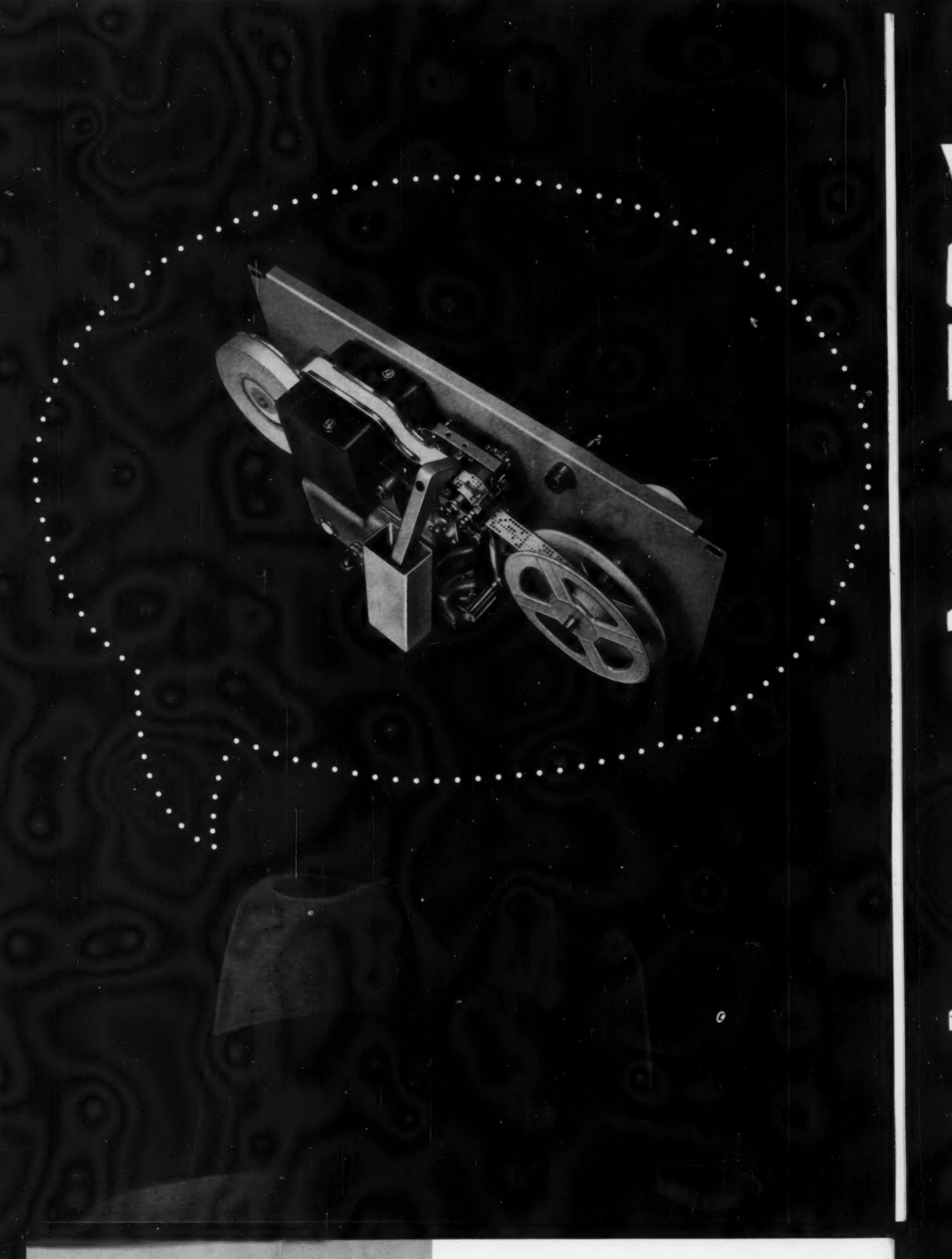
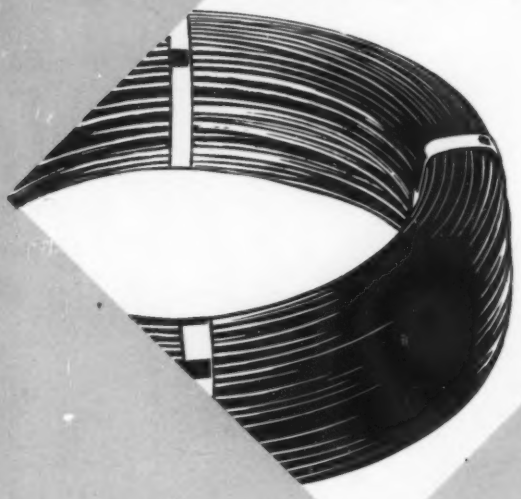
Ad 60-T-8



YOU KNOW IT'S FRESH



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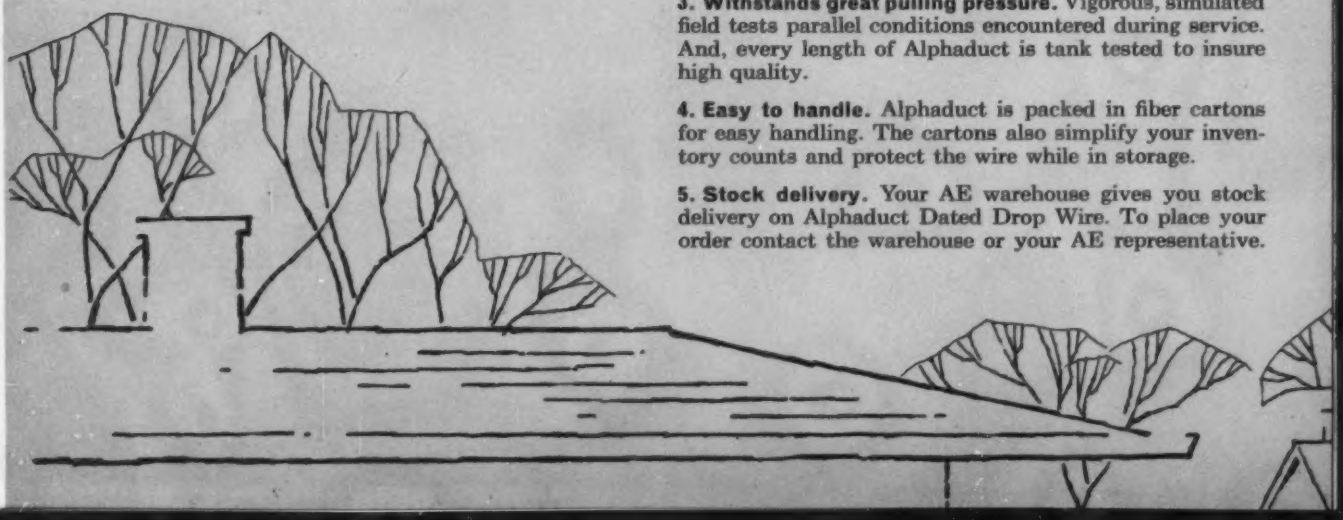
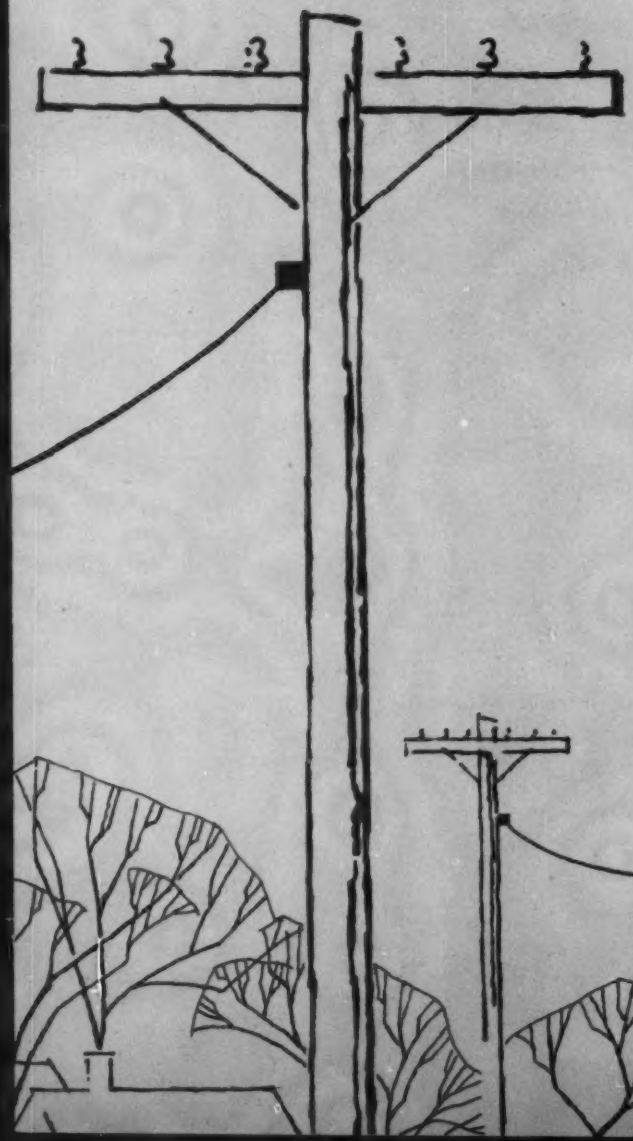
4. Easy to handle. Alphaduct is packed in fiber cartons for easy handling. The cartons also simplify your inventory counts and protect the wire while in storage.

5. Stock delivery. Your AE warehouse gives you stock delivery on Alphaduct Dated Drop Wire. To place your order contact the warehouse or your AE representative.





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A special one-hour color production adapted and staged by Martyn Green with this all-star cast (in order of appearance)

GROUCHO MARX AS KO-KO
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DENNIS KING AS THE MIKADO
AND HELEN TRAUBEL AS KATISHA

FEATURING DONALD VOORHEES AND
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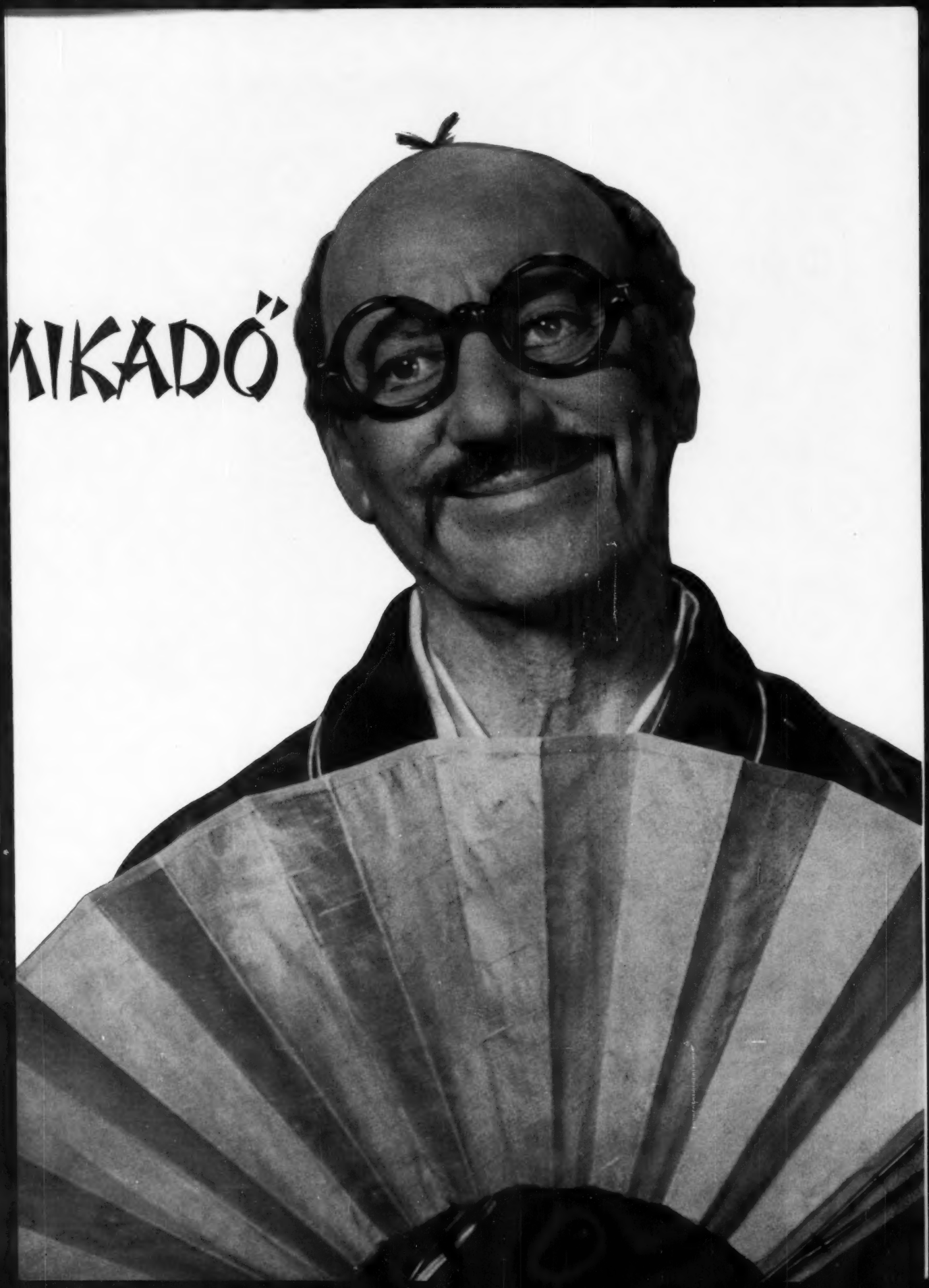
Round up your family and invite your friends for an hour of sheer delight, April 29—the first color presentation on television of Gilbert and Sullivan's immortal operetta, "The Mikado."

Imagine Groucho Marx as the resourceful Lord High Executioner! Imagine him singing a duet with opera's famous Helen Traubel! But anything can happen when the mythical town of Titipu comes to life under Martyn Green's direction.

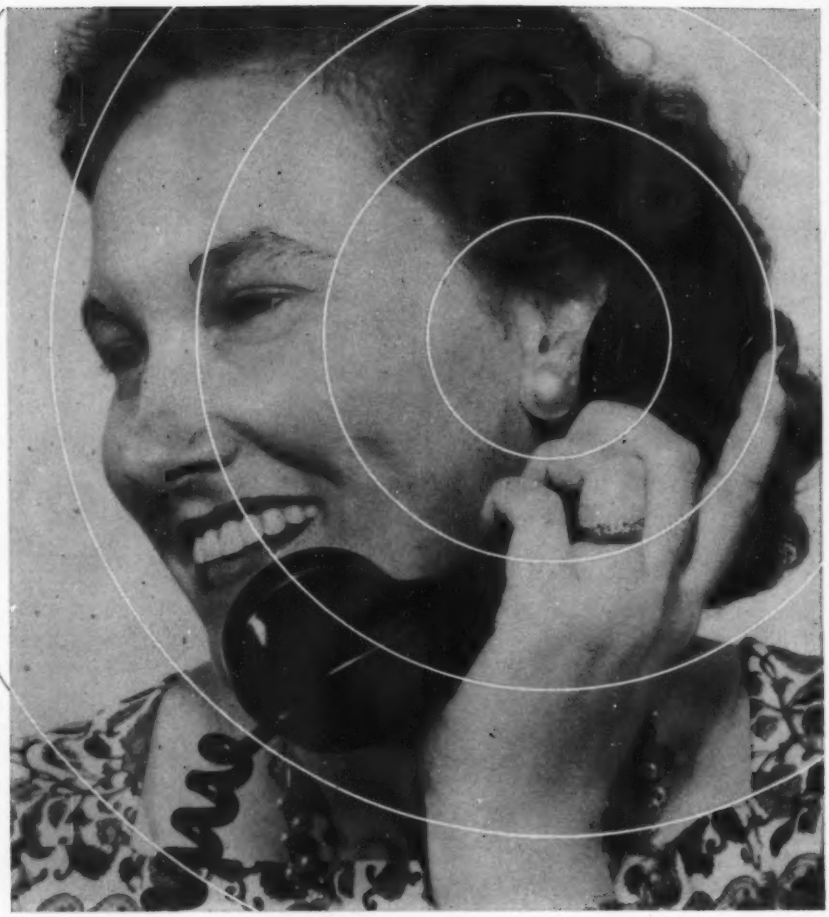
The commercials are also especially prepared to sell extensions, usage and Long Distance calls in the spirit of the production—and to the benefit of the entire telephone industry.

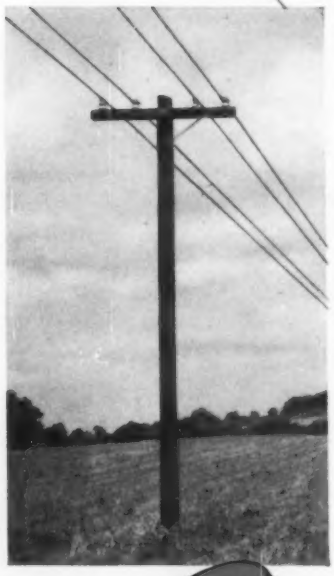
Consult your local TV listings for time and channel in your community. Friday, April 29, NBC-TV, 8:30-9:30 P.M., E.D.T.

Presented by the Bell Telephone System


MIKADÓ

Copperweld line wire has ear appeal





You keep your subscribers happy when you use Copperweld O-Eighty-Thirty Line Wire because it talks better than any other high-strength wire of comparable size. Since this top-performing line wire is completely non-rusting, there's no build-up of noise level or weakened signals caused by corrosion.

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SOLD BY LEADING DISTRIBUTORS

Copperweld® O-Eighty-Thirty

TELEPHONE LINE WIRE

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

Recent primary contest in Illinois illustrates how a candidate may be tempted to use utility rate matters for short-range political advantage. . . . Tells how utilities can protect themselves. Telephone directories useful in court.

THE Illinois primaries have come and gone and the Democrats and Republicans, respectively, have picked their gubernatorial candidates. The GOP nominated Governor Stratton for a third term, while the Democrats picked Chicago Mayor Daley's candidate, Otto Kerner. May the better man win in November.

Mr. Kerner's success in the primary threw a little sidelight of possible interest to the telephone industry. It appears that his main opposition for the Democratic nomination came from the state treasurer, Joseph D. Lohman. Mr. Lohman's pre-primary campaign was characterized by a savage attack, not only on the Daley candidate, Mr. Kerner, but surprisingly enough on the telephone business.

In a speech to the Evergreen Park Kiwanis Club on Mar. 22, Mr. Lohman also took on the Illinois Commerce Commission as well as the Illinois Bell Telephone Co. Since Lohman is—for the present at least—a political dead horse, there is not much point in recalling what was said in so much detail. The language used was anything but discreet, cordial or restrained. He referred thus to the Illinois commission: "arrogant, secretive and has demonstrated a shocking disregard for the ordinary citizens," who were said to be paying "the highest intrastate phone rates in the nation."

An Illinois Bell representative pointed out that the Chicago rates were lower in many instances than in other United States communities of similar size, and that the *local service rates were lower on the average than two-thirds of the states!* The Illinois intrastate toll rates were said to be below those in three-fourths of the states.

The significance of these charges and countercharges is not so much what was said (and later disproved) as why a candidate for the high office of the governor of Illinois should be so badly informed and why he should make such attacks. Where did Mr. Lohman get his information? And why didn't he check it with some responsible source, before making an indecent exposure of his lack of information?

Apparently Lohman was playing for the short-range effect of a popular appeal. In this case it did not pay off. The organization candidate Mr. Kerner polled 636,103 votes in the Democratic primary, to 226,620 for Lohman, and 179,426 for another candidate, Stephen A. Mitchell, former Democratic national chairman.

But it would be a mistake to conclude that Lohman's bitter and unfounded attack on the Illinois utilities, and their regulators, was the reason for his poor showing, or that, as a result, public utilities will be immune to such attacks from now on. On the contrary, it must be expected that other candidates will yield, here and there, to the temptation of demagogic appeal at the expense of public utilities and the regulatory commissions. It has happened before; and it will probably happen again. The controversy over the federal regulatory commissions now going on before Congressional investigators in Washington furnishes an unfortunate inspiration and a breeding ground for local politicians to get started on this kind of a campaign. Where other conditions, including their own abilities and attractiveness are such that such candidates do win, then the utilities are in for real trouble.

How Can the Utilities Protect Themselves?

The best and most powerful antitoxin against such virulent attacks is the simple truth. But like other effective serums and remedies, the truth is not always available, immediately and in the right form, to squelch some mudslinging politician who does not care what he says so long as he can get a short-range effect with sensational charges.

So, the incident in Illinois may be a lesson to utilities everywhere to prepare now and be forearmed against reckless political charges of this sort. They should develop trigger-quick files of statistics and statements in anticipation of such hit-and-run attacks. The technique frequently used in such assaults is the same as that employed by Mr. Lohman—mainly the old fallacy of comparative rates. By comparing some telephone rates in Chicago, for example, with hand-picked communities elsewhere, it is possible to furnish a surface disparity. The answer to this maneuver is to be ready with *other and more comprehensive comparisons*, which show just what the rate situation is in Chicago and elsewhere.

In addition to the over-all comparative rates, another technique employed

by those who like to make utilities a whipping boy is to measure any increase in the rate of return, however recent, by a percentage of a former period. The answer to this, as the Illinois Bell people were able to show, is a comparison of the return actually earned (4.3 per cent during the postwar years from 1946-59) in contrast with some recent improvement in earnings due to a rate increase.

It is also a good idea to have handy statistics showing what portion of the customers' rates go to the federal and state governments in taxes, and a comparison of the company postwar rate increases with increases in the general cost of living — rent, food, clothing, furniture, etc. On any of these bases, the relatively modest increases in public utility rates since the end of World War II will not suffer by comparison.

Another Phone Booth Argument

Perhaps by coincidence, but possibly by connection, a suit was filed against the Illinois Bell Telephone Co. in Cook County Circuit Court right after Lohman's political attack. It was filed by an attorney who has virtually made a career of filing suits against utilities. This unusual suit seeks to obtain 50 million dollars *in damages*, or refunds, on all profits by Illinois Bell in excess of 6 per cent on net investment. Since Lohman made strikingly similar charges, it could be that the unsuccessful candidate for governor got his information from the same source.

The attorney who filed this suit has an interesting background. He is known as Harry Rose Booth. He may be recalled by public utility people for his activities with the old Office of Price Administration in Washington, D. C., during World War II. He later established a connection with the Federal Communications Commission, thanks to New Deal support. But when he started making speeches in favor of Henry A. Wallace for President on the Progressive Party ticket in 1944, his New Deal supporters lost their enthusiasm. In any event, he returned to Chicago to practice law in 1947 and has not been on the Washington scene since.

Booth has appeared from time to time in the forefront of various legal attacks on public utilities. In 1950 he was one of the organizers of the Citizens Public Utility Committee for the Metropolitan Area of Chicago. The purpose of this 50-man group was to keep an eye on public utilities and to protect the small consumers' interest in all litigation with public utilities.

Booth has tangled at various times not only with Illinois Bell but with Peoples Gas Light & Coke Co., Commonwealth Edison Co., and the Chicago Transit Authority. In these suits he generally represents clients, some of which have been paper organizations, who have followed a similar pattern of systematically harassing utilities and other private business. Now, Booth, who is personally a cordial man and an experienced attorney, although certainly no utility rate expert, may be quite sincere about all this. Since it does not appear that he has ever won any of these suits, there could not be much money in it.

The question therefore arises as to why anyone would persistently follow such a futile course unless it were due to some ideological compulsion. Booth is one of the incorporators of the Utility Users League (started early in the Eisenhower administration to study laws, administration, and operation of agencies dealing with the regulation of public utilities). Actually the league appears to be a kind of a cardboard dummy, which intervenes as a "paper plaintiff" in a number of cases before the Illinois Commerce Commission.

This league actively fought the appointment of George C. McConnaughey of Ohio to the FCC in 1954 because he had once acted as counsel for a Bell system company. Booth was a member of the National Lawyers Guild (1938-43), later described as a front for the Communist Party in the Chicago area.

Born presumably in Chicago, he completed his law education at the University of Chicago and was admitted to the Illinois bar during the regime of Governor Henry Horner. During Horner's two terms, Booth got his real start in regulatory law as an adviser and counsel to the Illinois Commerce Commission.

This writer has gone into this background simply because it is difficult for him to understand why an experienced and well-informed attorney would recurrently attempt such suits in the nature of *damage actions!* On a strictly legal basis, it is hard to take them seriously. There is no law or precedent for the proposition that a public utility company already collecting rates, validly filed and approved by a regulatory commission, can be liable for damages and refunds, even if it were possible to prove that such rates *were* excessive.

The proper remedy in such case is to go before the regulatory authority with a complaint for rate reduction. Booth didn't do this. Instead he ignored the commission as a sort of coconspirator and filed an ordinary court suit for "damages," just as in the case of an auto accident.

And so, even though the latest case against Illinois Bell alleges "fraud" and the inability and unwillingness of the Illinois commission to grant adequate relief, the chances of any court granting "damages" to individual subscribers under such circumstances are so slight as to make the informed observer truly wonder why such an action was really started in the first place. It could hardly pay off even in terms of nuisance value. Probably the only one who could answer that is the indefatigable Bell twister, Harry Rose Booth.

What's In a Name

"A rose," said the Bard, "by any other name would smell as sweet." (Romeo and Juliet, Act II.) And a grapefruit by any other name will still squirt in your eye. But it may surprise telephone people to know that the Book of numbers—not the one in the Bible, but the telephone directory—has turned up as a very valuable assistant for the prosecution of a murder trial in the state of California. And all this because the telephone directory is such a convenient place to find names; and find them easily and quickly.

In the California case, paradoxically the assistant attorney general hired an expert on the subject of names to look in telephone directories and other directories from cities all over the United States, and some foreign countries as well, in order *not* to find a name. That sounds so crazy that a little explanation is in order. The murder trial at Downieville, Cal., involved a character with a rather imposing name for a murderer, Larry Lord Motherwell. He was accused of doing in a gullible widow and making off with her cash. And there was also strong suspicion that he had done in some other people before that.

Anyhow, this Motherwell was convicted on the strength of the evidence supplied by a learned professor of languages, known as an onomatologist. (This writer did not know what it meant, either, until he looked it up.) It comes from a Greek word and means the study of names, derivation, background, and so forth. A friend of this writer's at the FBI, who follows such things rather closely, said that the Motherwell trial was the first on record in which expert onomatological testimony was produced and admitted. But it must have impressed the jury.

The expert was Dr. George R. Stewart, who has written a book on names. And he is such an expert that if you told him your name (assuming that you did not invent it, as Motherwell invented the name which brought about his downfall), Dr. Stewart could probably

(Continued on page 102)

ABC of the Telephone

by Frank E. Lee

THE TERMS tensioning and sagging open wire, at first glance, seem to be rather inadequate descriptive terms for what they are meant to describe. However, they are widely used in open wire construction as well as in other phases of outside plant construction. Thus, a person should overlook the fact that they sound out of place and concentrate on the function they intend to describe.

Perhaps the feeling of inadequacy stems from the thought that the word "tensioning" means pulling something up neatly to a certain degree of tautness. "Sagging" seems to describe something that is droopy and rather sloppy. Thus, the two words seem to be at the opposite ends of the descriptive scale.

The basic operation is that of pulling the wires into proper position on the poles. This is accomplished when the wires are pulled tight enough (tensioning) to hold the wire high enough to furnish the necessary clearance above the ground. Also, this includes leaving enough slack in each span (sagging) to reduce the chance of breaking the wires under severe storm loading conditions.

From this brief description of the basic function, one can see that tensioning and sagging are two different ways of saying the same thing. Pulling the line up to proper tension will usually provide the correct sag. Also, pulling the line to the proper sag generally results in the correct tension for the line wire. As a result, the important point to keep in mind is that line wires can be pulled into the right position with either method. The chances are that the wire will be pulled into more precise position if both tension and sag are checked on any given installation.

Dead-Ending

A starting point must be established to permit pulling the line into position. A dead-end is generally used to fasten the wire at the first pole of a new line. A dead-end might be used at the start of a new section of line being built to extend an existing pole line. Also, a dead-end can be used at any place along the run where the added strength of this construction feature would be advantageous. The dead-end, under these circumstances, usually is called a false dead-end, because the line extends beyond the location of the dead-end. The construction is very much the same whether the fastening is called a dead-end or a false dead-end.

A dead-end can be made in any one of a number of ways. The basic difference in the various methods is in the type of fastener. Among the typical ways of making a dead-end are the following: Dead-end sleeve, wrapped dead-end, automatic chuck type dead-end, and the pre-assembled sleeve dead-end.

The dead-end may be made at a bracket mounted insulator bolted to a crossarm or at a regular pin mounted insulator. The bracket mounted insulator is somewhat the stronger mechanically of the two. The standard crossarm pin mounted insulator may prove the most practical if the line may be extended beyond the dead-end in a

Part 94. OUTSIDE PLANT CONSTRUCTION—Section 20. Dead-Ending, Tensioning, and Sagging Open Wire Lines.

Section 1. Planning of additions to outside plant (TELEPHONY, Nov. 17, 1956).

Sections 2, 3 and 4. Pole lines and poles (TELEPHONY, Nov. 24, Dec. 1 and Dec. 8, 1956).

Sections 5 and 6. Guy wires (TELEPHONY, Feb. 16 and 23, 1957).

Sections 7 and 8. Anchors (TELEPHONY, Apr. 27 and May 4, 1957).

Sections 9 and 10. New cable facilities (TELEPHONY, Sept. 14, 1957 and Mar. 8, 1958).

Sections 11 and 12. Fastening aerial cable to messenger strand (TELEPHONY, Aug. 9 and 16, 1958).

Section 13. Application of lashing rods, lashed cable supports, and typical aerial cable arrangements (TELEPHONY, Apr. 25, 1959).

Section 14. Self-supporting cable and wiring at aerial cable terminals (TELEPHONY, May 2, 1959).

Sections 15 and 16. Open wire lines (TELEPHONY, Aug. 22 and 29, 1959).

Section 17. Brackets and crossarms for open wire lines (TELEPHONY, Sept. 5, 1959).

Section 18. Open wire lines—use of insulators, and protection during installation (TELEPHONY, Oct. 17, 1959).

Section 19. Stringing open wire lines (TELEPHONY, Dec. 5, 1959).

reasonably short length of time. The dead-end sleeve method of dead-ending, illustrated in *Fig. 1*, uses a section of the line wire to form the loop or bail that is placed around the insulator of the dead-end attachment. A suggested way of making a sleeve dead-end is as follows:

(1) Use a piece of abrasive cloth to lightly buff and clean about 18 inches of the line wire end.

(2) Thread the line wire through one-half of the sleeve. (Insert the wire in the end, rather than inserting the wire at the center of the sleeve.)

(3) Loop the free end of the wire around the dead-end insulator.

(4) Position the sleeve about 6 inches from the insulator.

(5) Insert the wire into the end of the other half of the sleeve. The end of the wire should extend about nine inches beyond the center of the sleeve.

(6) Compress both ends of the sleeve with a sleeve pressing tool. Generally, there is room for three compressions on each half of a sleeve of this type. Care should be taken in compressing the sleeve because this provides the holding power of the completed dead-end.

The free end of the line wire usually is folded back into a loop to provide a convenient terminating point for drop or bridle wires extended from the open wire line.

Wrapped Dead-End

A wrapped dead-end is shown in *Fig. 2*. The dead-end is shaped at the factory to fit the insulator and line wire. Installation of this type dead-end is as follows:

(1) Place the dead-end over the insulator.

(2) Position the line wire against the dead-end. The free end of the wire can extend any desired distance beyond the point where the legs of the dead-end come together.

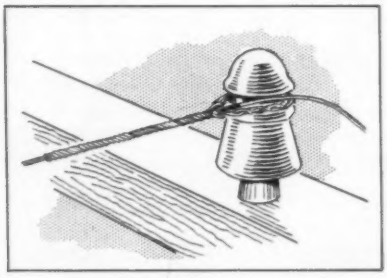


Fig. 2

(3) Bring the legs of the dead-end together and wrap them around the line wire. The helical legs grip the wire and pull tighter under load to provide the holding power of the completed dead-end.

The free end of the line wire extending from the dead-end can be formed into a terminating loop if desired.

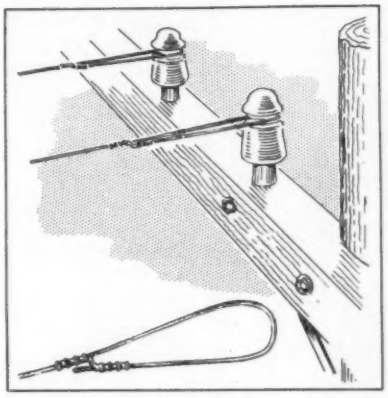


Fig. 1

Chuck Type Dead-End

An automatic chuck type dead-end is illustrated in *Fig. 3*. The dead-end consists of a ferrule chuck or grip and a demountable bail. The dead-end is completed as follows:

(1) The bail of the dead-end is unhooked, placed over the dead-end insulator and reassembled to the chuck or grip.

(2) The line wire is inserted in the chuck and extended as far as desired. A terminating loop can be formed in the free end of the wire if desirable.

Tiny jaws inside the chuck or grip furnish the holding power of this type dead-end. The wire can be easily inserted into the chuck. However, the jaws grip and hold the wire in place as the line load pulls against the dead-end.

Preassembled Sleeve Dead-End

The preassembled sleeve dead-end, shown in *Fig. 4*, is somewhat similar to the dead-end sleeve. This is a compression type dead-end. However, the bail is preassembled at the factory. The lineman has only to insert the line wire in the free end of the sleeve, compress the sleeve and the dead-end is completed. Drop or block wires are connected to the line wire—ahead of the dead-end assembly—because a terminating loop is not provided with this type dead-end.

The presence or absence of a terminating loop at a dead-end has very little mechanical or electrical significance.

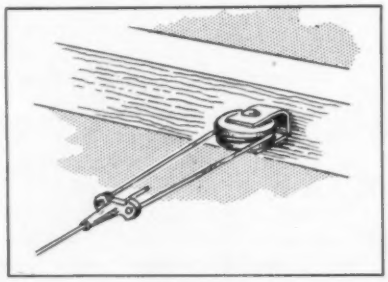


Fig. 3

Whether or not a terminating loop is provided is more or less a matter of convenience, rather than a necessity.

Tensioning and Sagging

Pulling up an open line wire to the proper sag or tension is as important as any other phase of open wire construction. This includes all of the elements of pole line construction—planning, setting poles, guying, anchoring, and similar parts of the over-all job. Considerable thought, time, and effort are required to build the pole line and string the wires. If these

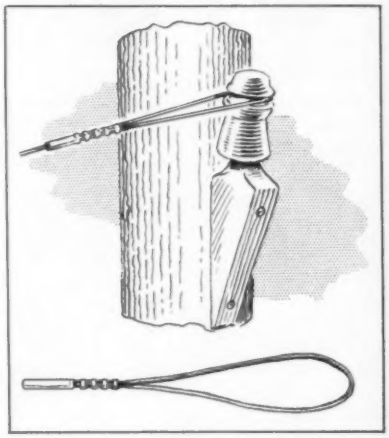


Fig. 4

portions of the job are completed well it is only logical that the wire should be properly placed on the poles.

Doing this part of the job right costs only a few moments time. The same material, the same amount of wire, and the same amount of time, for all practical purposes, will be used whether the wire is pulled up correctly or incorrectly. However, the service life of the completed installation is immeasurably lengthened and maintenance is greatly reduced when the wires are pulled to the correct sag or tension.

What happens if the line wires are pulled too tight?

Line wires are under abnormal stress when they are pulled too tight. This is the same as working any material or tool beyond the proper limit. This is like adding a length of pipe to a pipe wrench to gain more leverage to break a stubborn joint. The wrench may stand up for some time under the severe abuse. However, sooner or later one or more of the smaller parts in the wrench will bend or break under the excessive load.

Excessive Load

A line wire pulled too tight is working under an unnecessary and excessive load. The horizontal pull must be increased considerably to reduce the

amount of sag in the span. There is additional strain on the pole fixtures as well as on the wire itself. The wire or the attachments are more liable to break from severe storm loading under these conditions.

Why not leave excess sag in all open wire lines?

Excessively sagged open wire line spans have a number of disadvantages. The wires are liable to tangle or slap together as the wind moves them around. Ground clearance probably would not be maintained if the wires were allowed to hang too low in the span. Measurement of the amount of sag in a span is illustrated in *Fig. 5*. The first step consists of sighting an imaginary line between the points where the wire is supported. Next, a second line, parallel to the first, is sighted at the lowest point in the span. The sag is the distance between the two parallel lines. The same principle is used for spans on a grade as for lines on level ground.

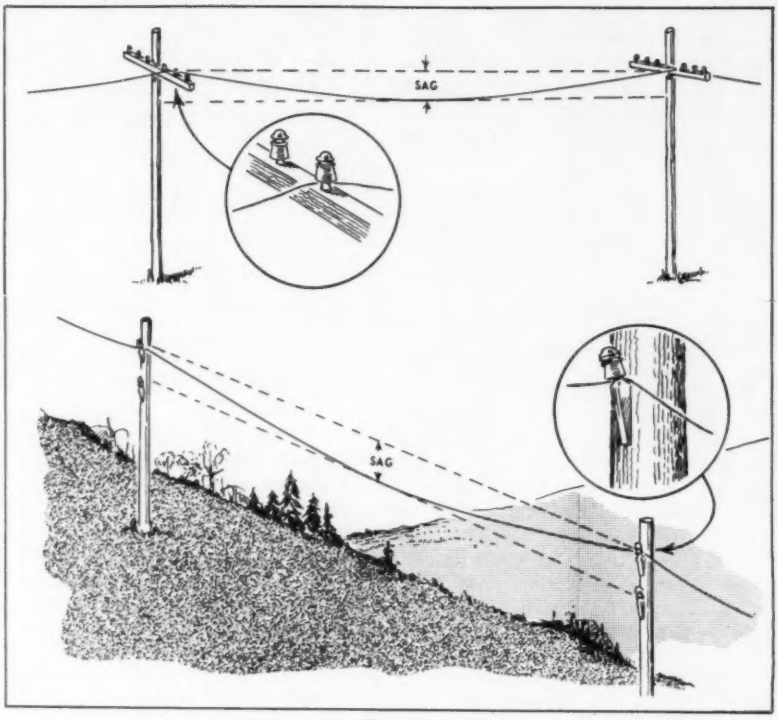


Fig. 5

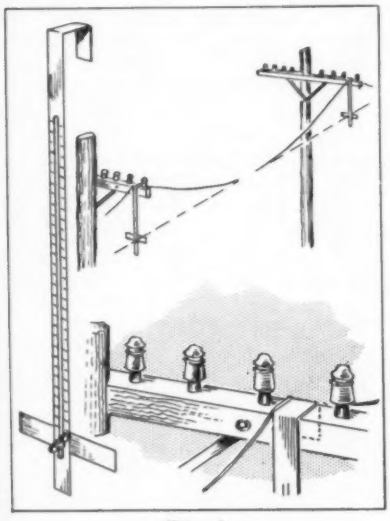


Fig. 6

The open wire generally is resting on the crossarm or pole bracket when sagging measurements are made during construction. As a result, the sag would be measured between the top of the crossarm and the bottom of the sag.

Use of Sag Gauges

Sag gauges can be used to simplify sag measurements. A typical sag gauge, shown in *Fig. 6*, has a squared off hook or stirrup which conveniently fits over a crossarm. Below the stirrup the gauge looks somewhat like an adjustable T-square. The shaft of the gauge is marked off in inches. The movable target can be locked with a wing nut at any place along the shaft. The gauge is used as follows:

(1) Set the targets of two gauges at the correct sag. Use the top of the target, like the sights of a rifle, to sight along the sag line.

(2) Hang the gauges on the crossarms at each end of a span. The best place to make the measurement is about 10 spans along the run from the dead-end or point where the wire being sagged is spliced to an existing line. The measurement usually is easier if the gauge at one crossarm is placed inside the wire being sagged and the gauge at the other crossarm is placed outside the wire.

(3) Apply tension to the line until there is somewhat less than the required sag. Then back off on the line until the sag is correct.

The sag gauge shafts can be extended by adding an appropriate extension section when deeper sags must be measured for long-span construction.

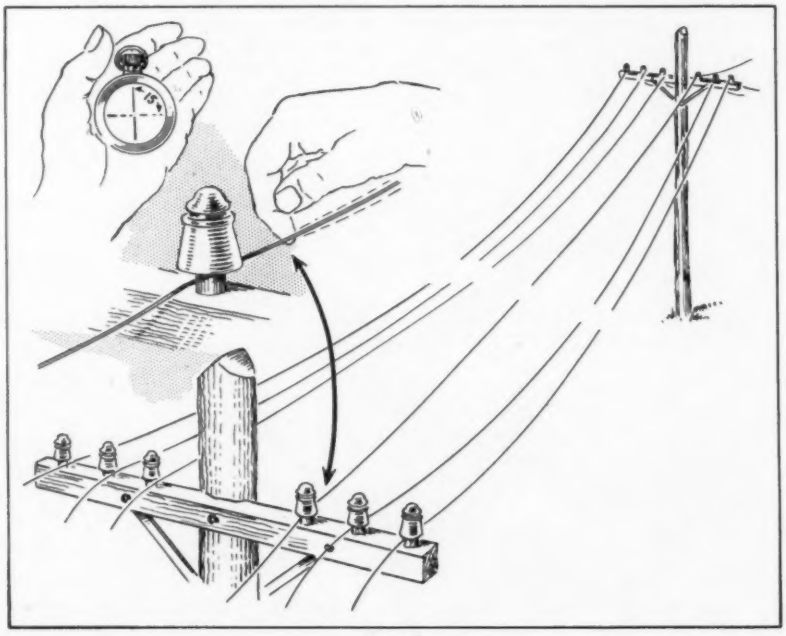


Fig. 7

The extension section might be a predetermined length of board or an aluminum or steel angle. The length of the extension section plus the length set on the sag gauge shaft would be equivalent to the amount of sag to be provided.

Sag Product of Tension

Sag, in addition to being measured in inches, is also a product of tension. There will be a certain amount of sag for a given span if there is a given amount of tension. The amount of tension in a span is also related to the rate at which the span will oscillate.

Actually, the oscillation rate of a span of open wire under various degrees of tension is quite similar to the oscillation rate of a violin string under various amounts of tension. As the string is tightened in the tuning process, the rate of oscillation increases and the pitch is higher. As the string is loosened, the oscillations are slower and the pitch is lower. Although an open wire span should never be as tight as a violin string, the rate of oscillation increases as the tension is increased by pulling the wire up tighter.

The fact that the rate of oscillation is directly related to the tension of a span—and thus to the amount of sag—can be used in either of two ways, as follows:

(1) Measure the time required for a specific number of oscillations, such as five or 10.

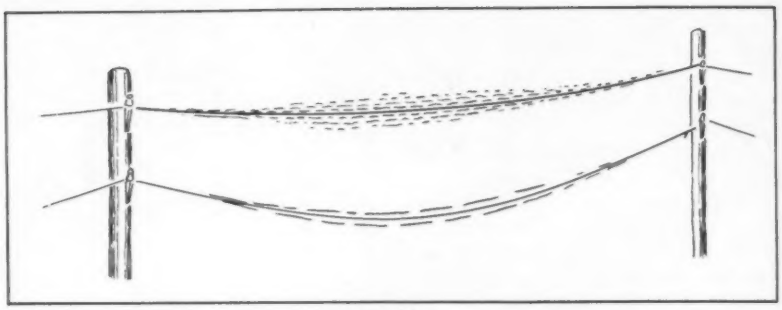


Fig. 8

(2) Count the number of oscillations in a specific length of time, such as 15 seconds.

These two procedures, illustrated in *Fig. 7*, are based on the same principle and are both very accurate. Timing a specific number of oscillations probably reduces the amount of error possible because the time can be measured accurately with a stop watch. Some margin of error is possible when attempts are made to count oscillations in a 15-second period. There always is the question of the point to which a partial oscillation has progressed at the end of the timing period.

Stop Watch Necessary

An accurate stop watch should be used with either oscillation measurement method. The watch should permit reading the time to one-tenth of a second when measuring the time required for 10 oscillations. A typical watch of this type is known as a 10-second timer. A complete revolution of the sweep hand on a large dial measures 10 seconds. Each second is divided into 10 parts and this makes possible the reading of the timer in tenths of a second. Usually a small dial on the watch records up to five minutes.

The oscillation test is made after the wire has been pulled up to the approximate sag and tension. For best results, the test should be made at least 10 spans away from the pole where the wires are dead-ended or are tied into the existing line. A level span is preferred for the test as compared to a span on a grade. Tests should also be made at approximately every 10 spans along straight runs. The location of corner poles and other obstacles will also have a bearing on where additional tests should be made.

During the tests the wire should be held at a uniform tension. The wire

TYPICAL SAGS AND TENSIONS FOR STRINGING HIGH STRENGTH COMMUNICATION WIRE MEDIUM LOADING AREA

Span Length in Feet	NORMAL SAG IN INCHES AT					Maximum Vertical Sag at 32° F. Inches	Maximum Tension at 15° F. Pounds
	0° F.	30° F.	60° F.	90° F.	120° F.		
250	12	15	18	23	29	38	670
270	14	17	21	27	33	43	700
290	17	20	25	31	38	49	730
310	19	23	28	35	42	55	750
330	22	26	32	39	47	61	770
350	25	30	36	44	52	68	790
370	28	33	40	48	57	74	820
390	32	37	45	54	62	81	840
410	36	41	50	59	68	87	860
430	40	46	55	64	74	94	880
450	44	51	60	70	80	102	900
470	48	56	66	76	86	109	920
490	52	61	71	82	92	117	940
510	57	67	77	88	99	125	960
530	63	73	83	94	105	133	980
550	69	79	90	101	113	142	1000
	AVERAGE NORMAL TENSIONS FOR ALL SPANS						
	340	280	230	187	153		

Table 1

under test should be resting on the crossarm or pole bracket at either end of the span. This contact is all that is needed to cause the oscillation to travel back and forth in the span.

Average Length Span

Inasmuch as the wire resting on the crossarm or pole bracket provides sufficient contact to cause the oscillation to reverse itself in the span, the wire should be free to oscillate without contacting tree branches in the span. The tests could be made on most any span. However, greater accuracy will result if a span of average length for the pole line is selected.

The line wire in the test span should first be pulled up a little tighter than required for the span involved, and then backed off to the approximately correct sag. This can be a line of sight sag estimate by the lineman on the pole who will make the sag measurement.

The lineman on the pole can operate the stop watch, or the watch can be held by a second person on the ground. The latter is easiest if two men are readily available during the test.

One hand is used to hold the wire against the insulator while the tests are being made. The wire should be struck with the edge of the other hand to set up the oscillations or traveling waves. For best results, make the wire oscillate horizontally if the number of oscillations in a given time period is small. This generally will apply to spans where 12 inches or more sag is required. A 12-inch sag will have an oscillation rate of one per second. The wire should be struck from the top or bottom to set up vertical oscillations when the test span has less than 12 inches sag.

The movement created when the wire is struck can be called oscillations or return waves. By either name, the movement is the same. The wire motion travels along the span in a specific wavelength. The traveling wave can be followed with the eye quite easily on longer spans with a correspondingly greater sag. This phenomenon of the traveling wave—as compared with the swinging of the full span in unison—makes possible the measurement of sag.

Travels Length of Span

The oscillation travels the length of the span and returns to the starting point. This is considered as one oscillation or return wave, when it is observed or felt by the lineman doing the counting. One finger is held close to or lightly against the wire to feel the oscillations as they occur. Repeat the test at least once to be sure the oscillation count is accurate.

The oscillation frequency is directly related to the amount of tension of the span, as demonstrated in *Fig. 8*. As a result, the oscillations increase as the amount of tension is increased. In the other direction, less tension means fewer oscillations. Therefore, tension should be added if the number of oscillations is less than called for on the oscillation table. Tension should be reduced if the number of oscillations is greater than specified.

SAG MEASUREMENT BY WIRE OSCILLATION

Sag in Inches	Oscillations in 15 Seconds	Time in Seconds For 10 Oscillations	Time in Seconds For 5th Return Wave
2	37	4.1	2.0
4	26	5.8	2.9
6	21	7.1	3.5
8	18½	8.1	4.1
10	16½	9.1	4.5
12	15	10.0	5.0
14	14½	10.8	5.4
16	13	11.5	5.8
18	12½	12.2	6.1
20	12	12.9	6.4
24	10½	14.1	7.0
28	10	15.2	7.6
32	9½	16.3	8.1
36	9	17.3	8.6
40	8½	18.2	9.1
44	8	19.1	9.5
48	7½	19.9	10.0
54	7	21.1	10.6
60	6½	22.3	11.1
66	6¼	23.4	11.7
72	6	24.4	12.2
78	5¾	25.4	12.7
84	5½	26.4	13.2
90	5¼	27.3	13.6
96	5⅛	28.1	14.1

Table 2

Charts Recommend Sag

Providing the correct amount of sag and tension is relatively simple once the principles are understood. The correct sag for a given span can be determined from a sag and tension table usually available from the wire manufacturer. In most cases, one of these tables covers the range of span lengths—in 10-foot increments—for which a particular wire is recommended. Separate tables are furnished with each type wire. *Table 1* contains information generally found in a typical sag and tension table. The information in *Table 1* is abbreviated for purposes of illustration and, as a result, is not as complete as a table of this type would be for on the job use.

The information shown on the sag and tension chart furnishes the recommended amount of sag. This data would be used for line of sight measurements. Reference should be made to an oscillation table when the amount of sag is determined by the oscillation or return wave method.

The relationship between sag and oscillations can be determined from *Table 2*. This table combines three of the popular methods of using wire oscillations to check the sag of a span.

In counting the number of oscillations in 15 seconds, the wire is struck as the stop watch is started. The number of oscillations or return waves are counted as the stop watch measures a 15-second period. Some linemen prefer to start the stop watch and the count at the moment when the first wave returns. In this case the next return wave would be counted as number one.

The other methods are based on the time required for a certain number of oscillations. In these tests, the stop watch is started when the wire is struck to set up the waves. The watch is stopped when the fifth or 10th wave returns.

The test should be made at least twice to be sure of the accuracy of both the timing and the count. The wire in the test span can be used as a guide to provide the correct sag in the rest

(Continued on page 68)

The First

INDEPENDENT WITH CBCD

California Water & Telephone Co. installs Coin Box Customer Dialing at San Fernando to speed up service and reduce traffic expense.

CALIFORNIA Water & Telephone Co. is the first Independent telephone operating company to have Coin Box Customer Dialing (CBCD) in service. CBCD is an Automatic Electric Co. development which enables paystation customers to dial short haul (AB) toll calls without having to dial "O" for a DSA (Dial Service Assistant) operator.

This new equipment is installed in California Water & Telephone Co.'s San Fernando exchange and was cut into operation in the first week of November 1959. California Water & Telephone Co.'s telephone properties are located in Southern California with approximately 155,000 telephones in service. The San Fernando exchange is located about 25 miles from downtown Los Angeles and serves approximately 62,000 stations from five central office buildings.

The basic purpose of the CBCD system is to permit paystation customers to dial those toll calls that would normally be completed manually by DSA operators. Operators are still required to monitor the deposit of the base charges, however, since the operator does not have to dial the number or time the call, her work time per call is greatly reduced. The installation of CBCD was designed to reduce traffic expense through automation. This article will present a description of the equipment functions together with an analysis of some measured traffic data.

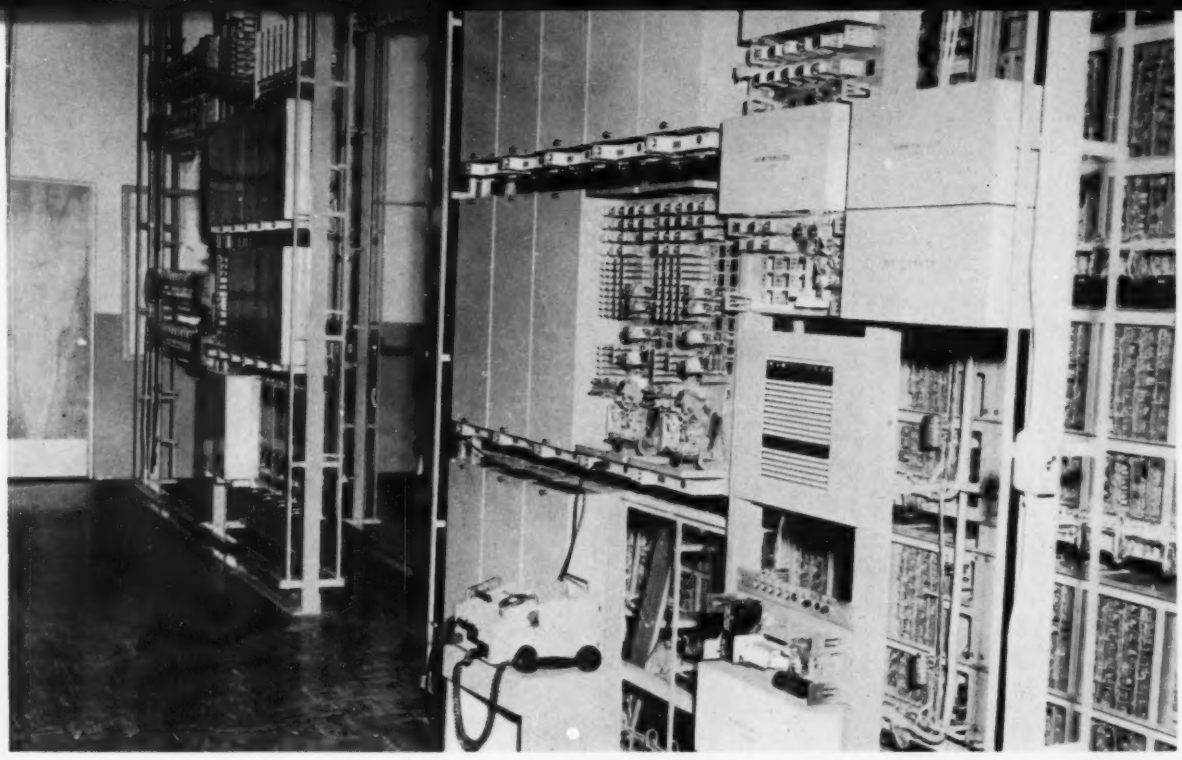
The special coin box equipment is designed to work in offices equipped with Directors. The Director, another AE development, enables a step-by-step (SXS) office to route calls in large and complex networks without the use of many Banks of Second Selectors. Directors register and supervise the ABC digits of each call. On a local call the Director sets the Primary Selector on the C digit, then disconnects and allows the call to progress through conventional SXS equipment. On calls to other exchanges the Director registers the complete number, calls for a translation, and then sends routing and registered digits as required to direct the call. Since the Director can send up to five routing digits plus all or part of the registered digits, the complex switching arrangements required in metropolitan areas can be handled efficiently.

The first Director equipped office in the United States was cut into operation by California Water & Telephone Co. at San Fernando in July 1948. Directors were then added to all of the company's offices in the Los Angeles Metropolitan Area as part of Type A-SATT (Strowger Automatic Toll Ticketing) equipment.

Paystations in a Director office, as

The Author

C. J. Williams Jr. started with California Water & Telephone Co. in 1946, working nights and during school vacations as a central office maintenance man. In 1951, he was graduated from the University of California at Los Angeles with a degree in electrical engineering. During the same year he was appointed to the company's division engineering staff. Three years later he was promoted to his present position as division equipment supervisor. In 1958, Mr. Williams passed the examination for Registered Professional Electrical Engineer, given by the California Board of Registration for Civil and Professional Engineers.



In general appearance, CBCD equipment looks similar to other central office equipment, except that the covers have been restyled. The three rectangular containers shown at the upper right contain equipment which processes charges for three-minute and overtime paystation calls.

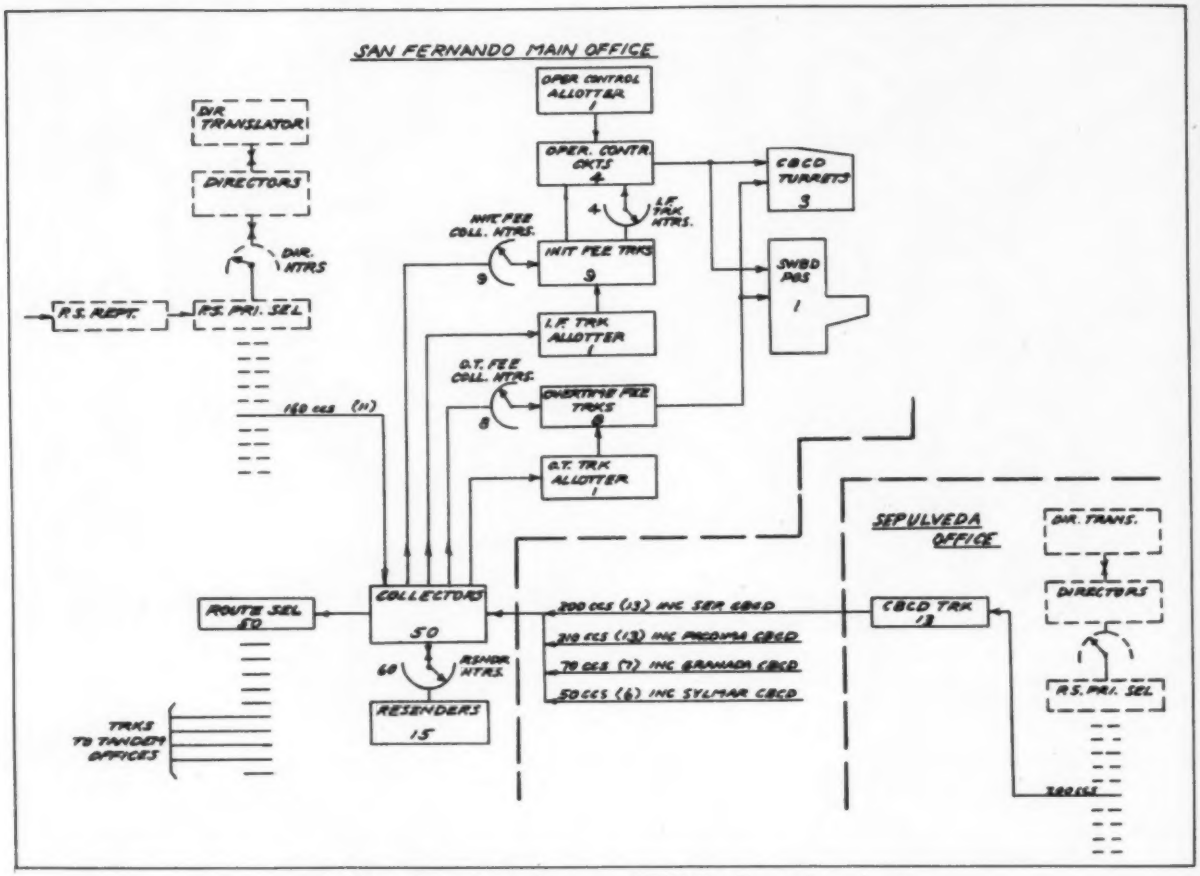
in regular SXS offices with pre-pay service, are served by a distinct group of Line Finders and First Selectors with a paystation repeater interposed to provide the necessary coin control facilities. The First Selectors are in this case the Director controlled Primary Selectors. Without CBCD, the paystation customer is required to dial "O" for an AB toll call which causes the Director to route the call to a DSA operator who completes and times the call manually.

With CBCD, the paystation customer dials the AB toll call directly which the Director routes to the CBCD equipment. A Collector is seized through the banks of a Primary Selector, registers the first two digits (rate), finds a Resender in the meantime, and routes the following digits to the Resender for storage. Upon Director release, an operator is signaled to monitor the deposit of the base charges (three minutes). The rate is displayed at the operator's position. Upon operator release, the call is extended automatically. Answer supervision starts automatic timing and all coin controls are automatic if the call is completed within the base period. The operator's single function is to monitor the coin deposit. Thus, on the 70 to 80 per cent of calls that are completed within the base period, the operator's work functions have been greatly reduced.

If the conversation time reaches the three-minute mark, an operator is signaled to state overtime conditions and place a CLR (Combined Line and Recording) hold on the switch train. The operator starts the timing of the overtime period by operating her trunk key to hold. When either party releases, the operator is flashed. The rate and elapsed time are displayed and the operator collects the overtime charge.

To give a more detailed account of how this is done, using the accompanying diagram, we will trace a coin box call from San Fernando main to a downtown Los Angeles exchange. The

Calls are monitored from five cordless positions. Operator's single function is to monitor coin deposits, thus enabling her to handle other switchboard work more adequately.



Schematic trunking diagram—CBCD San Fernando exchange.

Director determines that this is a coin box call from a class mark from the Primary Selector, then performs its usual functions of registering translating, and sending. In this case, four routing digits are required: One for the Primary Selector level to the CBCD equipment, two digits for the rate, and one digit to select the proper Route Selector level to the distant office.

A Collector is seized through the banks of the Primary Selector, registers the two rate digits, finds a Resender in the meantime, and routes the remaining digits into the Resender for storage. Upon Director release, the Collector places a mark to the Initial Fee Trunk Allotter which causes the Collector Hunter associated with an idle Initial Fee Trunk to find the calling Collector. The IF Trunk then causes the call waiting lamp to light on each CBCD Turret or Switchboard Position. Through the momentary operation of the Accept Key, an Operator's Position is connected to the calling IF Trunk via its associated IF Trunk Hunter. At this point a splash of –110 volt dc is returned to the paystation to refund the initial 10-cent deposit. The rate is then

(Continued on page 29)

Traffic Measure San Fernando Exchange — CBCD
795 Paystations in Service
Jan. 11 to 14, 1960

(1) Collector Traffic

Office	Trunk Group Busy Hour ccs	Exchange ccs	Busy Hour (10-11 a.m.) Attempts	Calls Completed*
San Fernando	72(10-11)	72	60	36
Sepulveda	89(10-11)	89	67	42
Pacoima	84(9-10)	52	35	28
Granada	18(10-11)	18	18	7
Sylmar	19(9-10)	14	12	7
		245	192	120

*Called Party Answers

(2) Initial Fee (B.H 10-11 a.m.)

B.H. calls to CBCD Operators	156 calls
B.H. ccs	30 ccs

(3) Overtime Fee (B.H. 10-11 a.m.)

B.H. calls to reach overtime	30 calls
B.H. ccs	5 ccs

(4) Resender B.H. ccs 84 ccs

(5) Calls Turned Back

B.H. D.S.A. calls-told to dial number direct	36 calls
B.H. Collect calls to CBCD-told to dial "O"	5 calls

The Collector Traffic was measured on a regular California Water & Telephone Co. Traffic Totalizer that has a 25-second scan interval. The initial Fee, O.T. Fee, and Resender Traffic were measured on a special totalizer that has a 5-second scan interval. The latter totalizer was designed and built by California Water & Telephone Co. to measure direct traffic.

Some additional information computed from the measured traffic is listed in *Table 2*.

Table 1

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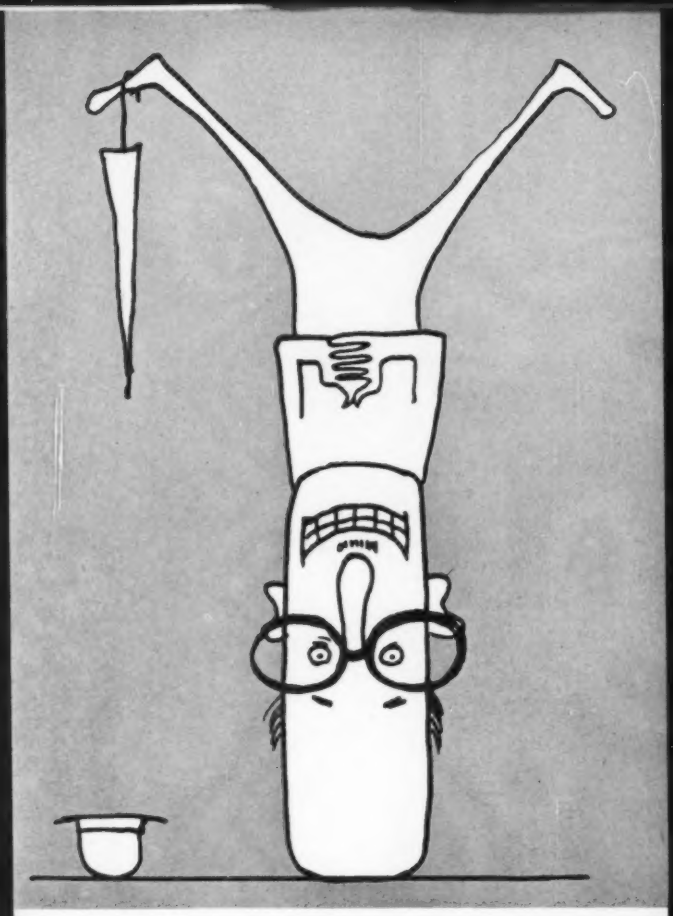
FOR MORE DETAILS, SEE THE NEXT PAGE



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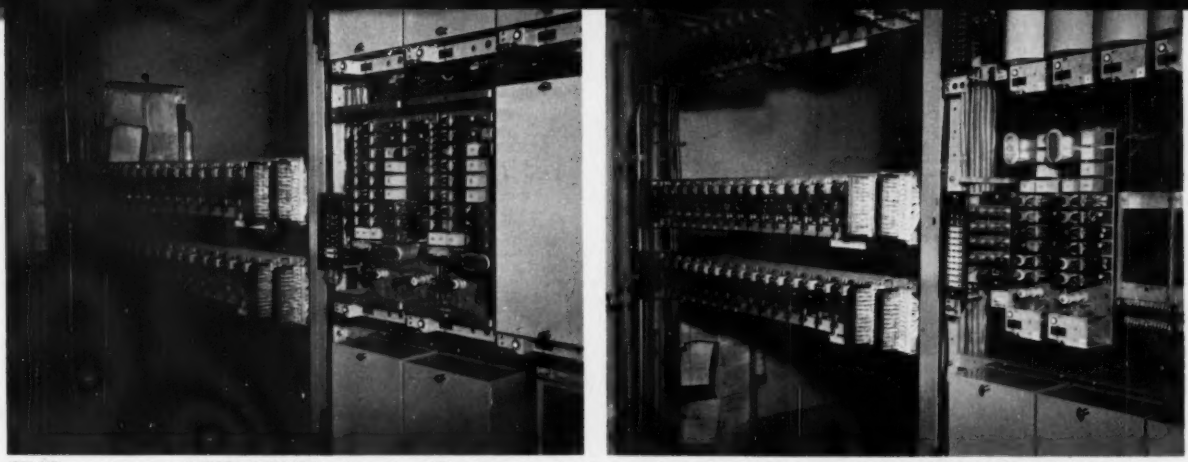


CBCD equipment. LEFT PHOTO: Overtime Fee Trunks (right) and Collector Hunters (left). RIGHT PHOTO: Initial fee Trunks (right) and Collector Hunters (left).

displayed to the operator who informs the customer and monitors the deposit of the base charge.

The operator then operates her Release Key which releases the IF Trunk and makes it available for another call. The Collector then seizes its associated Route Selector, and transmits a mark to the Resender to send all digits stored. Note, the above condition is for a call to a crossbar office where all digits are pulsed out after collecting the base charge. On a call to SXS office, the Collector signals the Resender upon cut-through to an IF Trunk to send all digits except the last two.

If answer supervision is not received and the calling party releases, the Collector cycles the refund voltage until the base charge is refunded. If answer supervision is received, the Collector begins timing. If the call is terminated within three minutes, the Collector and the switch train are released. The Paystation Repeater then cycles collect voltage until the coins are collected.

If the call is not terminated at the end of three minutes, the Collector places a mark to the Overtime Trunk Allotter which causes the Collector Hunter associated with an idle Overtime Fee Trunk to find the calling Collector. The seized OT Fee Trunk lights its associated answer lamp on one of the Operator Positions. The operator answers the call and informs the customer that he or she is talking on overtime. Upon operation of the Trunk Key to Hold (key ended termination) or upon restoration of the Talk Key (jack ended termination), timing of the overtime period is begun. (The switch train is held under the control of the operator). When the calling party releases, a mark is transmitted back to the Collector to drop the outgoing trunk. The operator is flashed when either party releases. When the operator re-enters, the rate index and total overtime minutes are displayed at her position. The operator then monitors the deposit of

(Continued on page 66)

Computed Traffic Information
San Fernando Exchange-CBCD

%	Miscellaneous attempts 192-156/192		= 19%
%	Calls to reach operator 156/192		= 81%
%	Calls to reach overtime 30/156		= 19%
%	Calls completed (called party answers)	120/156	= 77%
Avg.	Holding time including miscellaneous attempts	245x100/192	= 128 sec.
Avg.	Holding time calls to reach operator	241x100/156	= 155 sec.
Avg.	Resender holding time	84x100/192	= 44 sec.
Avg.	Initial Fee Trunk holding time	30x100/156	= 19 sec.
Avg.	O.T. Fee Trunk holding time	5x100/ 30	= 17 sec.

The following explanations and conclusions are offered as an analysis of the traffic data:

(1) The above traffic information is not conclusive since it is based upon only one four-day study and insufficient time has elapsed to allow the customer to become familiar with the new service.

(2) The high number of miscellaneous attempts will drop somewhat as the regular California Water & Telephone Co. paystation user becomes accustomed to CBCD. The situation should be greatly improved when other companies install a similar service. (The Pacific Telephone & Telegraph Co. plans to install the Bell Laboratories version of CBCD in some of their Number 5 crossbar offices in 1960-1962. They call their system CZD, which means Coin Zone Dialing).

(3) In computing the average holding time of the calls to reach the operator, each miscellaneous attempt was assumed to be approximately 12 seconds; hence 245 ccs-4 ccs = 241 ccs was used.

(4) The Resender holding time was a little longer than anticipated; however, this again may be attributed to the customer's lack of familiarity with the new service.

(5) The Overtime Fee Trunk holding time was much shorter than expected. This prompted the author to review the stop-watch study made at the operator positions. The samples were not taken on a busy hour basis. However, it was noted that most of the customers terminated their calls immediately after notification. Hence, it is assumed that a larger percentage of the 30 calls to reach an overtime condition during the busy hour terminated after notification.

(6) The stop-watch study gave an average notification holding time of three seconds and the average holding time for overtime collect was 10 seconds. Insufficient data were taken to arrive at an average conservation time.

As stated in our article, CBCD was designed to reduce traffic expense through automation. A coin box call handled by a DSA operator in San Fernando required an average work time of 86 seconds (Operator Coefficient 5.5). With CBCD, the operator's work time is cut down to approximately 21 seconds per call. This is based upon 19 seconds for initial fee plus the three to 13 seconds required for those calls that go into an overtime period.

To further illustrate the reduction in traffic expense we can compare the computed position requirements for the measured traffic volume of 156 BH calls. The coefficients of 5.5 and 1.5 will be used for DSA and CBCD, respectively.

DSA	156x5.5 = 858 Work Units	858/200 = 4.3	positions
CBCD	156x1.5 = 234 Work Units	234/200 = 1.2	positions
		Positions Saved	3.1

Since approximately three operators are required to staff a position, we have a reduction of nine operators besides the savings in positions. With the future coin box traffic volumes shown on the Trunking Diagram the reduction amounts to approximately 27 operators and nine positions.

Table 2

The Potential Market for

Telephone Answering Devices in the Service Industries

By ALEXANDER I. WARRINGTON*

THIS IS THE eighth installment of Mr. Warrington's article presenting statistics on the so-called service industries, by regions and states, which constitute a big potential market for telephone answering devices. The statistics given in this series should be of value to market analysts in telephone companies and those in charge of marketing telephone services.

The seventh installment was published in the Apr. 16 issue, in which market data were presented for REGION VII. West South Central—Arkansas, Louisiana, Oklahoma and Texas.

The first installment appeared in the Mar. 5 issue, covering REGION I.

*Mr. Warrington is an Industrial Economist of Baton Rouge, La., and has authored many articles for TELEPHONY during the past several years.

TABLE 1

Total Number of Service Units, Mountain Region, 1960

Geographic Region and State	Total Number of Service Units			Percentage Distribution
	Without Payrolls	With Payrolls	Total	
Mountain	67,600	64,400	132,000	100.0
Montana	8,000	6,400	14,400	10.9
Idaho	6,000	6,000	12,000	9.0
Wyoming	4,800	4,400	9,200	6.9
Colorado	17,600	18,400	36,000	27.2
New Mexico	8,400	8,400	16,800	12.7
Arizona	12,000	10,400	22,400	16.9
Utah	7,200	6,400	13,600	10.3
Nevada	3,600	4,000	7,600	5.7

This is the most basic table of the entire series. It is based upon the "1954 U. S. Census of Selected Service Industries," which was adjusted for 1960.

"Service units without payrolls" (first column) are, for the most part, individuals who operate some kind of service establishment as a regular business and without paid help.

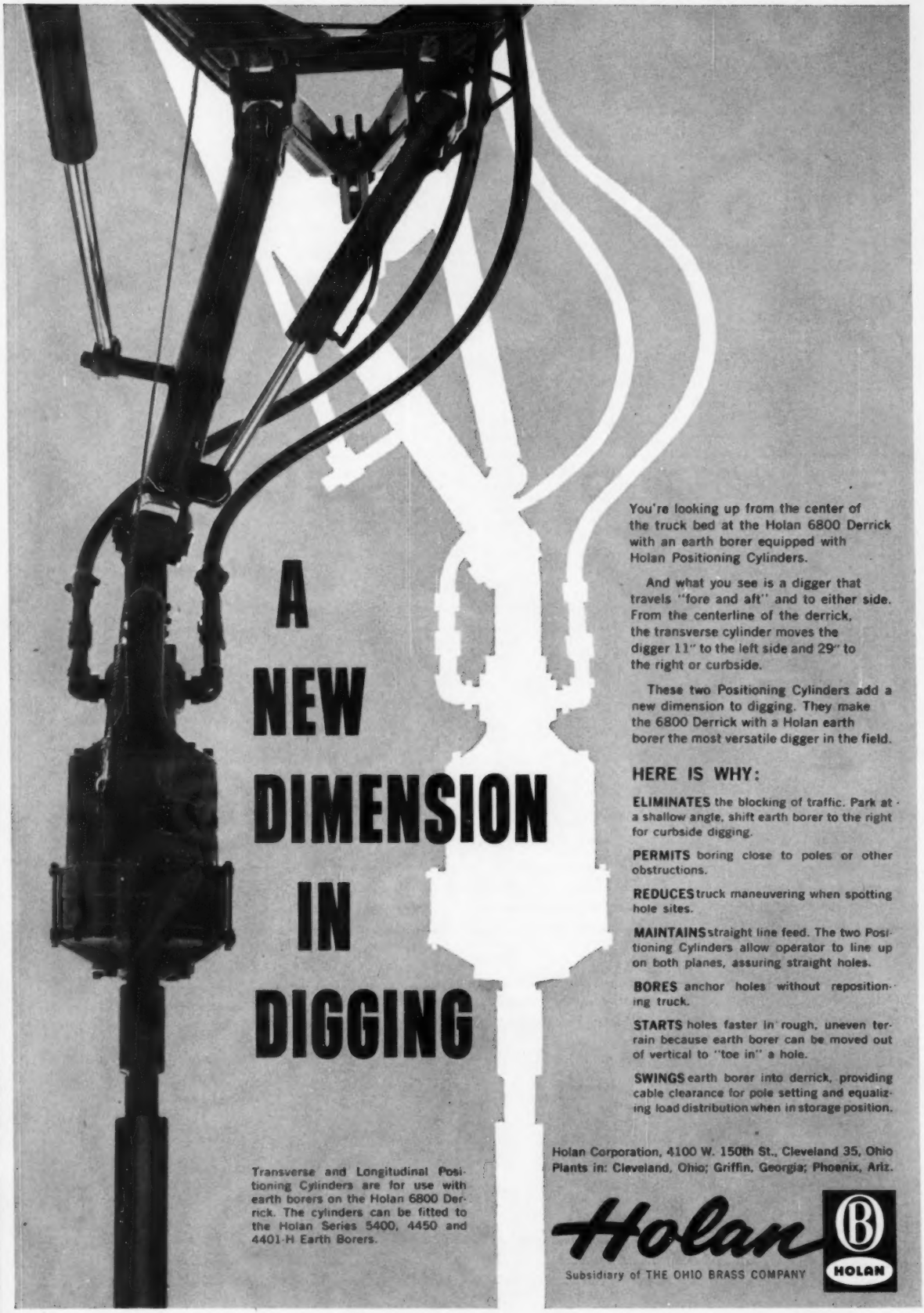
"With payrolls" signifies service units that maintain paid employes.

TABLE 2

Total Number of Service Units, Mountain Metropolitan Areas, 1960

State and Metropolitan Area	Total Number of Service Units			Per Cent of State Total
	Without Payrolls	With Payrolls	Total	
Colorado	17,600	18,400	36,000	100.0
Denver	7,600	8,400	16,000	44.4
Pueblo	800	800	1,600	4.4
New Mexico	8,400	8,400	16,800	100.0
Albuquerque	2,000	2,400	4,400	26.1
Arizona	12,000	10,400	22,400	100.0
Phoenix	2,000	5,200	7,200	32.1
Tucson	2,400	2,400	4,800	21.4
Utah	7,200	6,400	13,600	100.0
Salt Lake City	3,600	3,200	6,800	50.0
Ogden	800	800	1,600	11.7

Information is of the same type as in *Table 1*, except data are for metropolitan areas.



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The second installment, covering REGION II. Middle Atlantic—New York, New Jersey and Pennsylvania, was published in the Mar. 12 issue.

The third installment was published in the Mar. 19 issue, covering REGION III. East North Central—Ohio, Indiana, Illinois, Michigan and Wisconsin.

The fourth installment appeared in the Mar. 26 issue, covering REGION IV. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.

The fifth installment appeared in the Apr. 2 issue, covering REGION V. South Atlantic—Delaware, Maryland,

(Continued on page 85)

TABLE 3

The Market Potential for Answering Instruments for the Mountain Region, by Degree of Intensity, 1960

Geographic Region VIII and State	Number of Service Units			Total Number of Service Units
	Primary Market	Secondary Market	Tertiary Market	
Mountain	67,600	18,700	45,700	132,000
Montana	8,800	1,900	4,500	14,400
Idaho	6,000	1,800	4,200	12,000
Wyoming	4,800	1,400	3,000	9,200
Colorado	17,600	5,300	13,100	36,000
New Mexico	8,400	2,500	5,900	16,800
Arizona	12,000	3,600	6,800	22,400
Utah	7,200	2,200	4,200	13,600
Nevada	3,600	1,100	2,900	7,600

The *primary* market is the market which will require the least effort and the units shown therein are close to the total of the number of answering devices needed. The need is urgent because the operator or the service unit has no tangible human assistance.

The *secondary* market represents service establishments that have one and only one paid assistant. This is also a rich potential market for telephone answering devices. Approximately 80 per cent of service units with one paid employe need answering instruments.

The tertiary market represents the balance of service units and has a potentiality for telephone answering devices of from 30 to 50 per cent of the units shown.

TABLE 4

The Market Potential for Answering Devices, for the Mountain Metropolitan Areas, 1960

State and Metropolitan Area	Number of Service Units			Total Number of Service Units
	Primary Market	Secondary Market	Tertiary Market	
Colorado	17,600	5,300	13,100	36,000
Denver	7,600	2,500	5,900	16,000
Pueblo	800	200	600	1,600
New Mexico	8,400	2,500	5,900	16,800
Albuquerque	2,000	700	1,700	4,400
Arizona	12,000	3,600	6,800	22,400
Phoenix	2,000	1,600	3,600	7,200
Tucson	2,400	700	1,700	4,800
Utah	7,200	2,200	4,200	13,600
Salt Lake City	3,600	1,000	2,200	6,800
Ogden	800	200	600	1,600

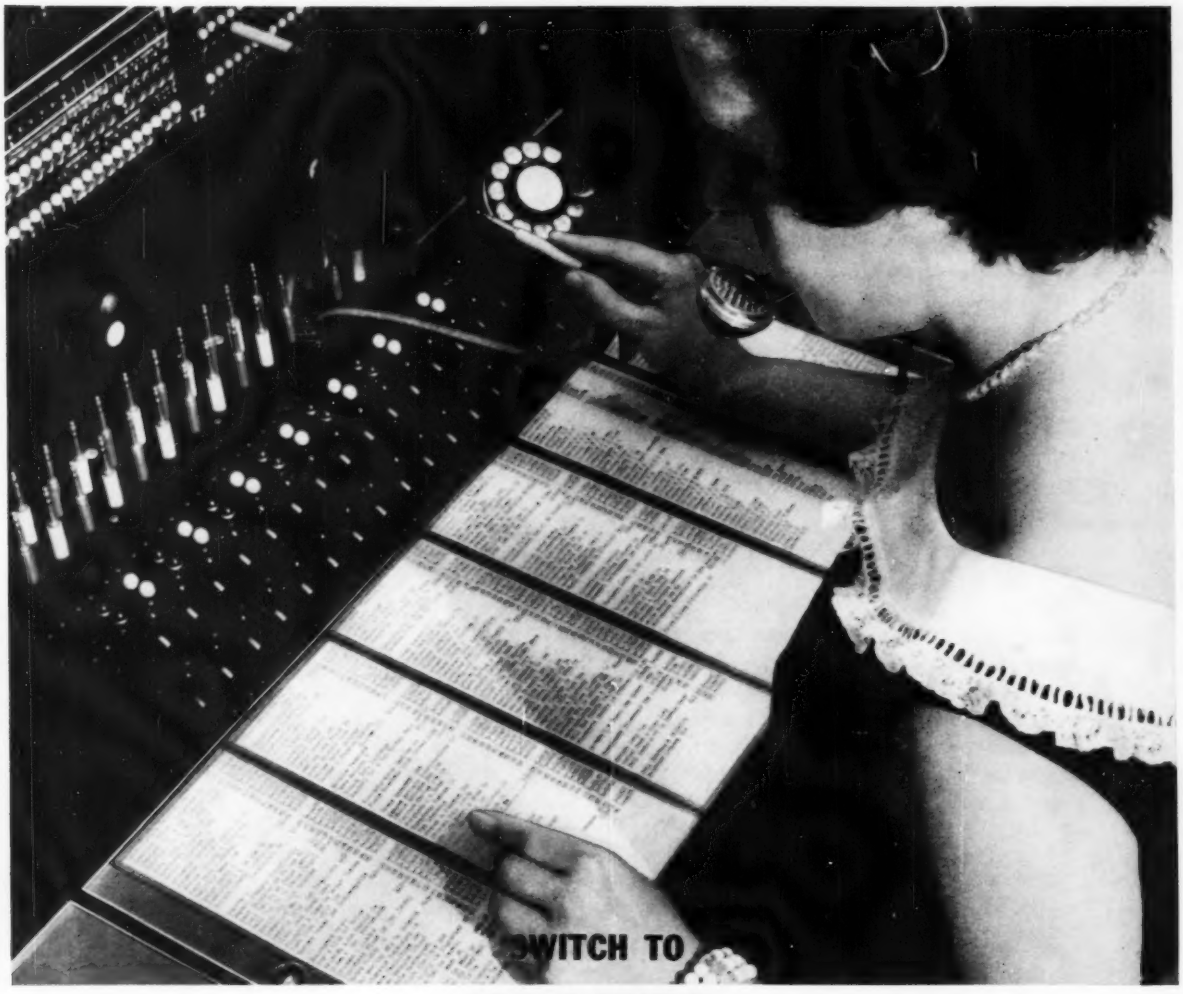
This table is identical with *Table 3*, except it is for metropolitan areas.

TABLE 5

Percentage of Total Telephones Absorbed by Service Units, in the Primary, Secondary, Tertiary Markets for Answering Devices

Geographic Region VIII and State	Total Number of Telephones	Percentage of Total Telephones Absorbed by Service Units			Total Number of Telephones
		Primary Market	Secondary Market	Tertiary Market	
Mountain	2,136,200	3.1	0.8	2.1	100.0
Montana	220,700	3.6	0.8	2.0	100.0
Idaho	198,500	3.0	0.9	2.1	100.0
Wyoming	112,700	4.2	1.2	2.6	100.0
Colorado	654,900	2.6	0.8	2.0	100.0
New Mexico	229,900	3.6	1.0	2.5	100.0
Arizona	321,500	3.7	1.1	2.1	100.0
Utah	304,200	2.3	0.7	1.3	100.0
Nevada	93,800	3.8	1.1	3.0	100.0

This table should be useful to market analysts in making more detailed analyses and also in adjusting *Tables 1* through *4* annually. The adjustment of *Tables 1* through *4* can be made by using total telephones as a base. With the elasticity that is provided by *Table 5*, *Tables 1* through *4* should prove of service for at least five years.



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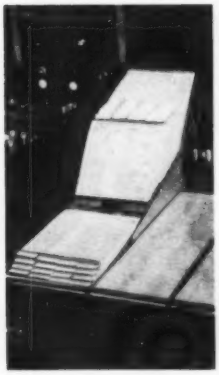

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Topics . . . *get the most for your money*

By WINNIE B. BURNETT**

IF YOU ARE one of those misinformed or misled people who detest the term "peg count," run—don't walk—to the nearest file cabinet and rid yourself of this article, because that is what we are going to talk about—traffic studies and force adjustment.

Peg count and force adjustment are old stories, but the step-by-step process from the planning through scheduling may not be known to all. So, with the thought that a fundamental knowledge of the various phases may help, we will discuss the high spots of force adjustment.

The biggest sum of money spent in the traffic department is for "time" purchased from employes. It is essential both service-wise and cost-wise that just enough operators be scheduled to maintain good service during all hours of each day.

The method of determining the needed number of employes for each hour of each day is from use of past records of call and message volumes —*peg count records.*

Peg Count Is Starting Point

So, the basic starting point for all traffic department force provision planning is *peg count.* Counts are made only of the basic operations, but each coefficient includes an additional allowance to cover incidental items of work that are not separately counted.

A supplementary count is made periodically to count and analyze each individual operation to determine the average work time. The sum of these work-times constitutes the so-called "occupied" time.

Since we know that signals cannot be spaced to come in at an even flow, there are times when the operator is "waiting to serve." The sum total of the "occupied time" and the "waiting to serve" time establishes the coefficient value for that particular work operation. Rules for counting individual items and tables for coefficient values are used in equating peg counts.

Units Per Call

By dividing the total *toll units* by the total *toll calls disposed of,* we get the *units per call.* This is used until the next toll supplementary peg count.

The same method is used for local calls, using local units and local calls to get *units per local call.* To get *units per information call,* there are some variances like separate values for interstate and intrastate calls, but the process is essentially the same.

The regular monthly, quarterly and yearly local and toll counts are applied to the units per call values (derived from the supplementary counts) to get the *average work units per day.*

Force Adjustment Keyed to Loads

Force adjustment is the complex thing, and it is keyed to *loads.* During the monthly count, the number of employes on duty in the central office is counted to get the *load hours.* The load hours are then broken down to *board load* and *overall load.* The total average daily work units divided by the total average daily load hours will give the *overall load.* The hours of the employes actually working at switchboards, including auxiliary boards, divided into the total units constitutes the *board load.* These loads are *work units per operator hour.*

In our company, the larger offices calculate the board and overall loads each weekday and similarly for Saturdays and Sundays.

In the smaller offices, the load developed from the monthly peg count is used as representative of the month.

Coefficient values and loads are not always the exact measure of work in any office, but they do provide a fair way to estimate by comparison. They are a good picture of the average work time values. In other words, they are valid measurements of average conditions within the offices. One thing is certain—the important data developed from peg counts is only as true as the peg count on which it is based. So, the importance of an accurate peg count cannot be over-emphasized.

From this data, and taking other pertinent factors into consideration, the probable number of calls and work units your office will have is estimated. From this estimation, the number of people needed to handle this volume of estimated traffic is determined—the necessary force is planned.

How to Schedule

After the number of people required to handle the estimated traffic volume has been determined, a schedule must be drawn putting the necessary number of people on duty when they are required each hour of each day.

To do this, estimate the unit volumes for an average day, a maximum day, and a minimum day. Divide the estimated minimum day's units by the maximum over-all load to get the requirements for the basic schedule. The difference between the minimum and maximum days will give the requirements for supplementary tours. The fundamental schedule requirements are constructed from the average day.

In deciding the hourly-on-duty requirements, the experience of the force, the "team size" and hourly distribution of calls and requirements based on average loads must be considered.

Then the schedule is drawn, first the basic schedule, then the supplementary tours for anticipated "maximum" traffic.

Similarly, Saturday and Sunday

(Continued on page 62)

*Traffic Operating Practice

**Mrs. Burnett is Traveling Chief Operator of Southwestern States Telephone Co. of Brownwood, Tex.

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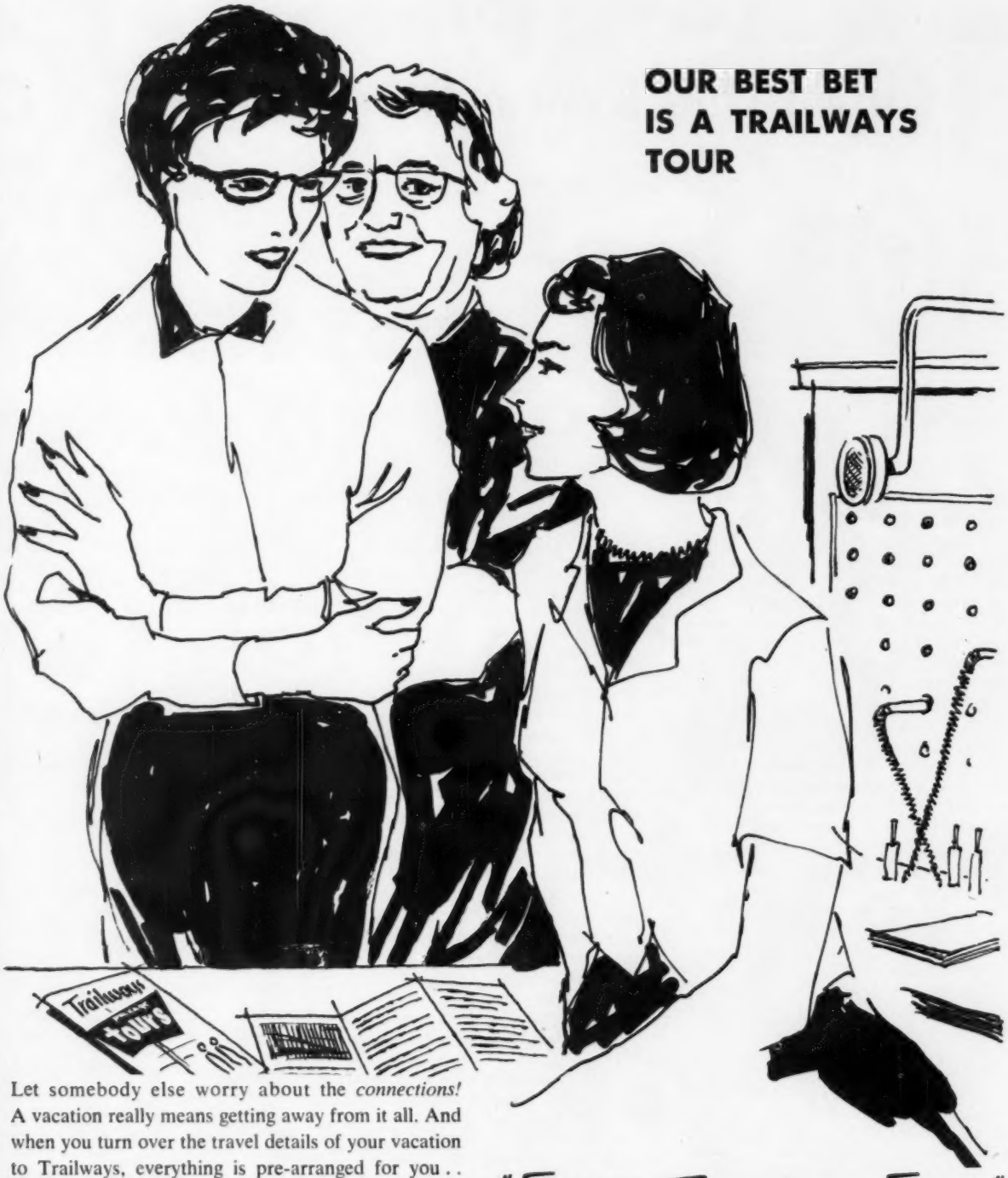

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TROUBLE CLEARING

If Only I Had Kept a Record!

By L. N. MARTIN

AT THIS season of the year, many a citizen has been saying, as he struggled with Internal Revenue Form 1040, "If only I had kept a record!" This situation even became a favorite subject for comic sketches on radio broadcasts.

Such a record is so easy to keep. Just a "day book" in which is recorded, *each day*, all items that may be useful in preparing Form 1040 will suffice. These items are: All income and capital gains, showing from whom received and all deductible expense, showing to whom paid.

It is much better, however, to post these items to a ledger with separate accounts for each source of income and each class of deductible expense. With such a record, the annual struggle with Form 1040, which often lasts for days or even weeks, is avoided, and the report is prepared in a few hours.

The telephone man has a year-round bookkeeping problem. If a record system is properly set up and maintained, it will have him time and money, and bring prosperity to his company. It is often said that the most frequent cause of business failures is lack of capital. Our observation is that a close second is lack of good bookkeeping.

The telephone man has many kinds of bookkeeping. There are the accounts with subscribers, from which billing is prepared. He will not neglect *these* accounts because they are his bread and butter, but he may at times make some costly or embarrassing errors.

Must Keep Financial Accounts

Then, there is the financial accounting specified by commissions. The telephone man has no choice as to whether or not he will keep these accounts, and keep them in the exact manner specified for his class of company. We have seen cases where a small company has hurt its own interests by failing to distinguish between capital and maintenance accounts.

PART 74. The preceding article in this series appeared in the Feb. 20, 1960 issue.

When we say "small company," we do so with the greatest respect. The very large companies (Independent and Bell) need no help from us in solving their accounting problems. Our "first love" are the thousands of small companies, their owners, and managers who play such an important part in furnishing the nation's telephone service.

This writer is first of all a plant man, and this article will deal with certain records and accounts of the plant department in which the units are not dollars, but items of material, items of physical plant in service, man-hours, and even trouble reports. Nevertheless, all of these things are ultimately measured in dollars gained, or dollars lost.

Some companies divide the labor force into two classes: Production employes and others who are, by inference, non-production employes. Construction linemen, installers, repairmen, and central office maintenance men are in the first class. The second class includes such people as bookkeepers, clerks, and sometimes even engineers. We have never been in sympathy with such a classification. We believe that all who contribute in any way to the earnings and prosperity of the company are actually production workers.

Recently, we were visiting with the owner, who also did most of the plant work, of a small exchange and we watched him install a new telephone. He drove to the address to see what terminal would be used. (This trip would not be necessary if he had the proper records.)

He then climbed the terminal pole and tried to find a vacant pair. It soon became evident that he had no cable record whatsoever and did not even know the count of the terminal. He tested all pairs that were not wired out of that terminal and found them all working.

No Cable Record, Handicap

We then volunteered to help him make a cut and thereby got ourselves into quite a job. While the writer handled the office end, our friend made trips to many terminals. At each he spent much time calling in to ascertain the line number working on each pair. We had no cable record, and no record of terminal counts, many of which proved to be split counts. By this method, we hoped to prepare a partial record of that part of the cable plant that would enable us to find a pair for the new telephone. This job was started at 9 a.m. and at noon we had not yet figured out a cut. "If only I had kept a record!"

After lunch, we went at it again and finally made a cut and had a good pair in the desired terminal. We also knew the split count of that terminal. The telephone was then installed. The elapsed time was about five hours for a job that should have required only 45 minutes.

Would the time required to set up a complete and accurate cable record at this exchange be "unproductive" time? Our friend saw the point and asked us to tell him how to go about setting up a complete cable record in an old exchange.

The cable record here mentioned shows the usage of each pair and the count of each terminal. It must be posted each time a telephone is installed or removed and when a pair is changed for any reason.

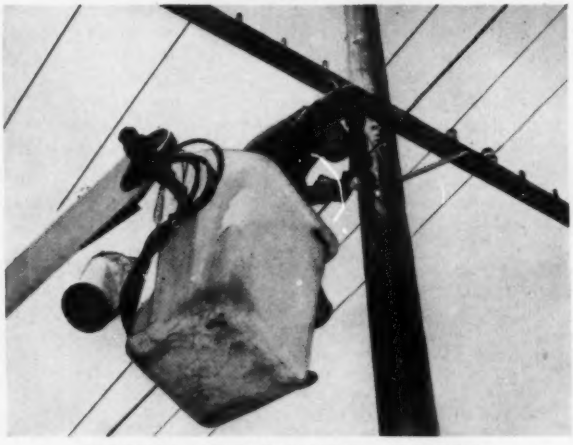
Another record in the form of a map shows the layout of the cable, the distance in feet from the central office to each terminal and to each point where the type or gauge of the cable changes. The loop resistance, obtained by actual

(Continued on page 87)

PLACING CABLE

DISMANTLEMENT WORK

PLACING "B" RURAL WIRE



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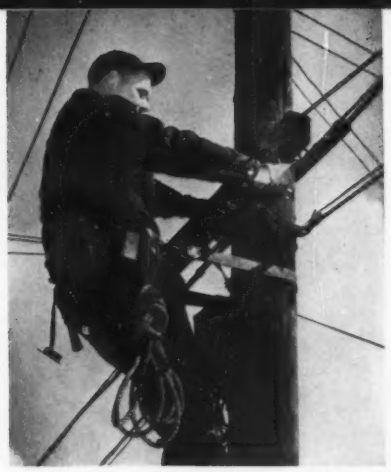

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE *Michigan Bell* magazine recently carried an interesting story describing the methods used by that company for the installation of telephone wires and electric power lines underground in a common trench. This type of construction has been used in several new Detroit area subdivisions during the past year.

To bury an electric power line and telephone cable, a narrow, 41-inch-deep trench is dug. Then, the power line is placed on the bottom of the trench and covered with 12 inches of dirt. Over this layer of dirt, polyethylene-insulated telephone cable is laid, usually a 25- or 50-pair. Then the trench is filled completely.

The terminals along the telephone cable serving the area are mounted on hollow poles about 42 inches high. Actually, these are hollow steel posts which contain the connecting terminals. Each post throughout a subdivision rests beside an Edison power transformer. One telephone terminal serves four houses with the final wire link lying hidden under the lawns.

•

We have always considered good insulators to be a necessity on all open wire telephone lines.

Now we are informed by an experienced engineer that a hole bored in a crossarm and fitted with a short length of plastic tube to insulate and cushion the line wire provides an entirely satisfactory arrangement and furnishes good telephone service. It would seem though that threading the line wire through these holes in the crossarms would not be an easy task.

•

It seems a bit odd that the intercommunication device which can be attached to the regular telephone in a residence, and has been available for some time now, has not come into more general use.

Another desirable feature of this arrangement is that it can also be arranged to answer the front or back door and, by the use of a speaker microphone, used to talk to callers without opening the door. This arrangement has the special advantage that women folks home alone, especially at night, need not open the door until the visitor makes himself known.

•

When the Santa Fe Chief collided with an oil truck near Bakersfield, Cal., and the locomotive and several cars left the track, killing 17 people, it also interrupted telephone service to several communities. A 200-pair cable and four crossarms of 104 copper wire were destroyed in the wreck area.

Service was restored in record time by burying a 200-pair cable around the wreck. The derailment occurred at 5:10 p.m.; by 12:50 a.m. some circuits were returned to service. At 2:30 a.m., five "N" carrier systems were placed in service and three hours later all circuits were restored.

•

The writer has recently conducted some interesting experiments with a new labeling machine.

This plier-type machine can be conveniently used to prepare labels of letters and numerals to serve many useful purposes around any telephone exchange. These labels are made on ½-inch colored vinyl adhesive tape and on aluminum tape, plain or adhesive. This type label should prove useful on cables, stock bins, etc. The aluminum labels can be used for pole numbers, terminal marking and other outside-type designations.

•

It is reported that New York City will become all-dial during 1960, after 38 years of dial cut-overs. The last manual switchboard will be converted to dial this spring. Approximately 10 per cent of the nation's telephones are still manual.

•

Recently, we received a letter from the president of a large operating telephone company which did not indicate his telephone number. We had a need to call this official for additional information and experienced some delay by not having this information.

Strange as it may seem, many large business concerns have not as yet listed their telephone numbers on letter heads, business cards, advertising, etc. We continue to contend that it would be a fine idea if everyone would add the telephone number(s) to his address. This would then permit everyone to compile and maintain a telephone directory of frequently called numbers.

•

Stereophonic stethoscopes, now being marketed in this country by a German firm, are claimed to give "better distinction between heart tones." Transistorized models are also being developed for hard-of-hearing doctors.

•

We had a talk the other day with an engineer who had attended a one-day course of special instruction conducted by Automatic Electric on solderless wrapped connections. This man appeared to be well versed in the "do's" and "don'ts" of the solderless wrap method and he predicts that it will prove both economical and practical in the Independent field.

•

According to AT&T's magazine *Long Lines*, they now have about 1,000 women working in plant. They are outnumbered by men, 11 to one, however. They work in area, division and district administrative offices and in plant central offices. Those working in the central offices are truly in a technical world. They are kept busy preparing trouble tickets, making up private line orders and reports, or any other job which helps to make the craftsman's task easier. Many of these young ladies have been telephone or teletypewriter operators and are now working on the other side of the switchboard.

As Long Lines' facilities have expanded, the number of women in plant

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More and more business and industrial concerns are looking to telemetering and remote control to cut costs and increase efficiency. Lenkurt offers several types of equipment to do this job. For example, there's Type 51B.

Type 51B is designed to operate over the wire or radio facilities which it supervises. When linked to any wire line or carrier channel, up to 80 remote indications can be supervised, and 90 remote operations can be controlled from a single control center.

For full details ask for Circular 51B-P4.

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For more facts on progressive planning for growth, call your Automatic Electric representative, or write T. B. Collins, Director, Carrier & Radio Sales, Automatic Electric Sales Corporation, Northlake, Illinois.

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has grown tremendously. It has more than tripled since 1935. The highest percentage of women was during World War II, when many men left for the service.

On a trip through West Germany a couple of years ago, the writer was somewhat surprised to note the large number of women working on installations and maintenance in telephone central offices. It is a curious fact that while women work in our factories in large numbers fabricating telephone equipment, seldom do we see them working on the installation and maintenance of the equipment that they help to build.

•

To speed up experiments in the field of missile development, the world's longest private telephone line was recently placed in service. This line extends from Cape Canaveral, Fla., to the Boeing airplane company's plant in Seattle, Wash., a distance of 2,600 miles.

Important data on Boeing's Bomarc missiles, under test in Florida, are sped by this private line to Boeing's computing equipment in Seattle. Scientists estimate that this line cuts one or two days off the testing time in the vital race for missile superiority.

•

We have a report to the effect that some operating telephone companies are making use of telephone answering devices for local troublemen to report trouble cleared.

The troubleman dials the machine, gives his name, the telephone number and reports the trouble found, just as he would when reporting to a deskman. Later, a female clerk plays back the record and transcribes the information for the necessary reports. Undoubtedly, this is a time and money-saving arrangement.

•

It is reported that about 17,000 conventions were held in this country last year with a combined attendance of more than nine million persons.

•

We have a report on a plastic tubing that shrinks to half size when subjected to the heat of a hair dryer. This sleeving proves useful as a neat insulation that can be easily applied to wire connections and terminal lugs.

•

Crosstalk: Morale is defined as when your hands and feet keep on working after your head says it can't be done.

•

In San Francisco, if you lead your dog on a public bus, you must buy him a ticket. If, however, you carry him and hold him on your lap, there is no charge.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. What is meant by maintaining climbing space on poles used jointly for power and telephone?

A. This is a clear space to be maintained between attachments on every jointly used pole, so that workmen climbing up and down the pole can do so with reasonable safety and convenience.

This climbing space is defined as an area 30 inches square measured horizontally, and free from all obstructions, for climbing through the telephone conductors to reach the power conductors above. This space can be only on one side or corner of the pole.

•

Q. Is the use of a fuseless substation protector considered satisfactory?

A. This type of protection is considered satisfactory for use on drops from aerial cable where the omission of fuses is sanctioned by the National Electric code. This will usually be where a drop extends from a pole to a building and is not exposed to electrical hazards.

•

Q. What type of time announcer is considered suitable for use in a medium-sized Independent telephone exchange?

A. Various types of time announcers are available and all of them are considered suitable for the use you have mentioned. This equipment may either be purchased outright, or can be leased at a fixed rate per month. When leased, the rental includes installation and maintenance.

The Automatic Time Announcer is a completely automatic and self-contained unit which permits operating companies to supply telephone users with accurate verbal time announcements from recordings on magnetic tape. This unit is particularly adaptable to automatic exchanges of all types, step-by-step, all-relay, rotary, etc. It may also be used on manual exchanges when necessary.

This machine delivers announcements every 15 seconds by employing the usual pattern of "At the tone, the time will be . . . ," followed by a tone signal exactly on the 15th, 30th, 45th, and 60th seconds of each minute.

Completely automatic service by the time announcer avoids the expense and possibility of errors incurred when time announcements are given by operators.

•

Q. We would like the name of a good book on frequency modulation that will meet the needs of a student of communication.

A. We believe that a soft cover book of 160 pages titled: "Principles of Frequency Modulation" will meet your needs. The author, B. S. Camies, is a well-known British engineer. This book can be obtained from TELEPHONY for $3.50.

Written specifically to suit the needs of the student, technician, and engineer, this book is a comprehensive account of the basic principles underlying the use of frequency modulation, the transmission of frequency-modulated waves, the difference between frequency modulation, and phase modulation.

Frequency modulation theory is clearly detailed for the reader, beginning with a brief history of the development of FM. Then, a number of calculations are developed slowly to illustrate the sideband structure and bandwidth necessary for the transmission of FM waves. Later, space is devoted to an explanation of the various advantages of FM and AM receivers in receiving signals in the presence of various kinds of interference.

•

Q. What are video pairs in telephone cables, and how are they used?

A. They are wide-range, balanced-transmission lines that are used for numerous high frequency applications. These are specially designed pairs, and may be placed in distribution or trunk cables containing either paper-insulated or plastic-insulated pairs.

Video pairs are often used for remote TV pickup points, such as ball parks and convention halls. These same pairs are also suitable for use on other high frequency applications such as closed circuit TV, telephone carrier circuits and links to microwave stations. Cables containing video pairs may be installed aerially, in underground ducts, or can be armored for direct burial and submarine use.

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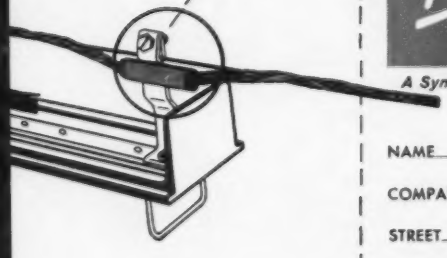

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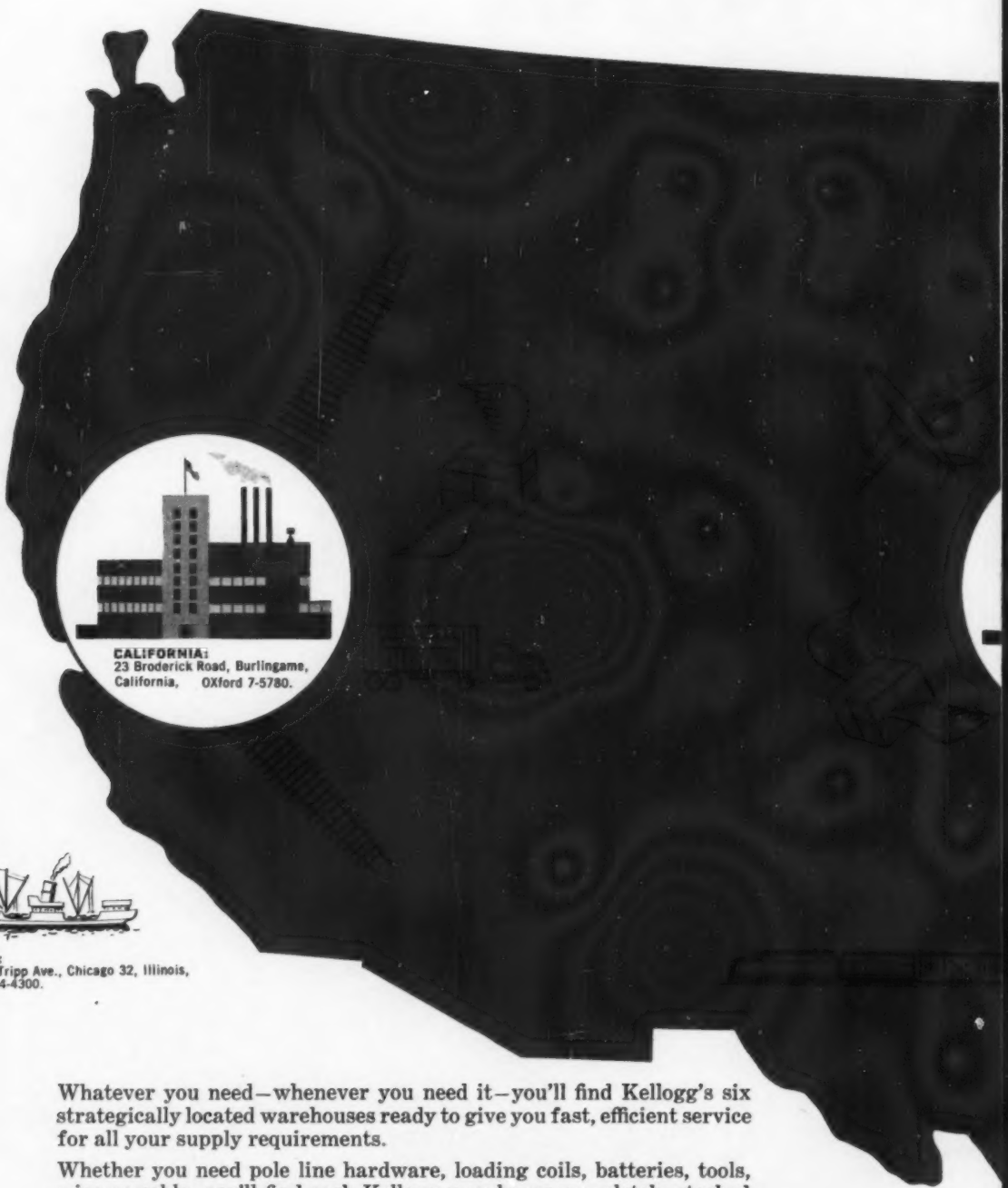

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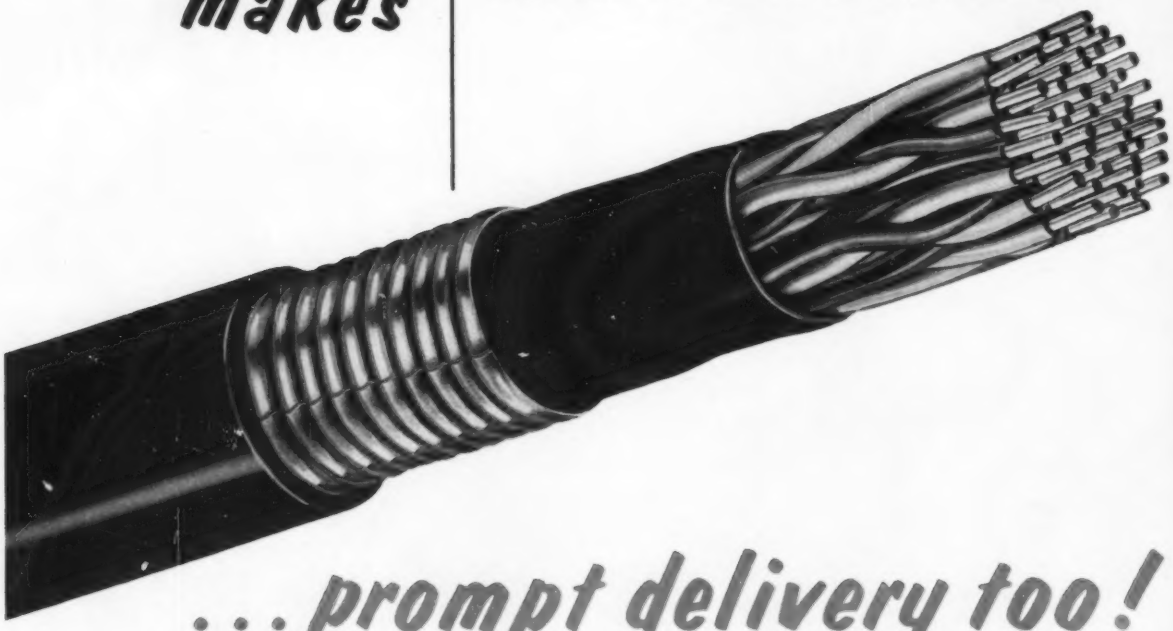

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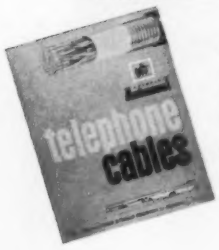

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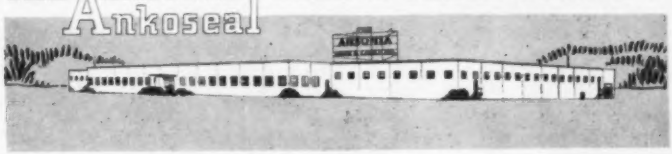

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CREATIVE ENGINEERING FOR THE PUBLIC UTILITY INDUSTRY SINCE 1892

Rolling Test Stand for Carrier Maintenance

By DOUG PLASKETT*

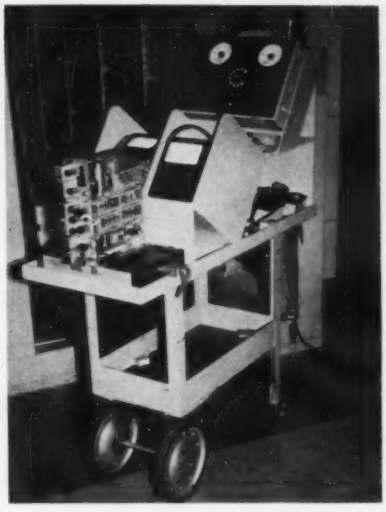


Fig. 1

HOW TO conveniently get all the test equipment necessary to maintain N-ON carrier systems into a 3-foot wide aisle, and still not block the aisle is a problem. A technician-planned test stand shown in Fig. 1 which could be wheeled out of the bay when required elsewhere, was the solution.

The stand is made out of one-half inch plywood and is held in place by the weight of the test sets. Two wooden blocks, screwed to the underside, prevent any side movement.

Although most of the dimensions are shown in *Fig. 2*, the type of sets to be used may vary and their size should be taken into account. The area behind the multi-tester is used to store extra cords.

Spare tubes, relays and small test sets such as the tube tester and repeater test set are stored in the area under the signaling test set. Long connecting cords can be coiled and stored in the lower compartment of the wagon. The test sets are tilted at a 60° angle. This angle is not severe enough to affect the operation of the signaling test set, if the set is modified to permit its operation when vertical. Many of these sets are so modified as to permit their being hung on a wall or patch bay while being used.

To make the modification, remove the set from its case and drill a 1½-inch hole through the side of the aluminum case. The hole should be located just behind the case handle, centered about 1½ inches from the bottom. This hole should line up with a metal plate 2¾ x 4¾ inches which contains a socket for the plug-in relay.

The plate can be bolted to the existing bracket that contains the original socket. After the new socket is wired to the existing socket, the relay can be changed from one to the other, and the set can be used in a vertical or horizontal position.

A metal strip bolted to the bottom of the case can then be made to engage in a similar metal strip bolted to the patch bay or wall.

Bumpers (not illustrated) were bolted to the lower section of the wagon to prevent the possibility of damage to working tubes. These bumpers extend 10 inches from the fore end and 13 inches from the rear (signaling set) end. The bumpers are 5 inches off the floor.

When in use, the stand can be wheeled from system to system and still lets the tester get past the stand if necessary. The test sets are conveniently arranged to make channel line ups fast and simple. When not required, the equipment can be rolled out of the way of regular traffic.

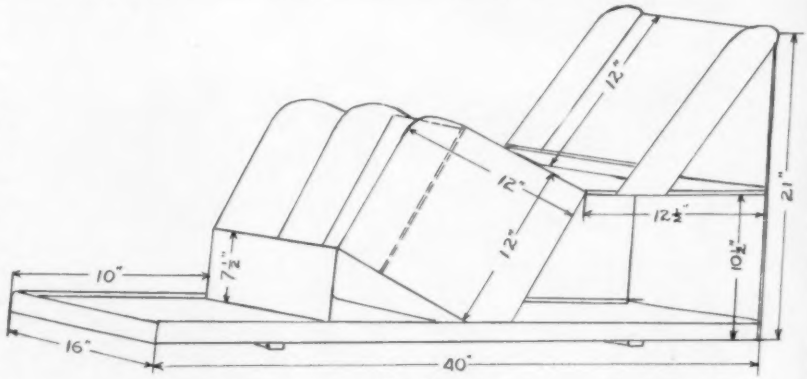


Fig. 2

*Mr. Plaskett is with the Bell Telephone Co. of Canada at Waterloo, Ontario. For 13 years, he has worked in construction, installation and repair departments. Before working on signaling developments, he was responsible for voice transmission maintenance. During this time he was involved in two cuts to VNL.

U. S. C. of C. Offers Film On Economic Facts

The Chamber of Commerce of the United States has produced a color-slide presentation called "Who Profits from Profits?" which the Chamber suggests contains many of the economic facts relating to questions of profits, wages, prices, and other business puzzlers.

"If you were up on economics," says the Chamber, when questions arise, such as high profits, raising wages and lowering prices, "you might reel off figures." But most businessmen do not have such figures at hand to call into play.

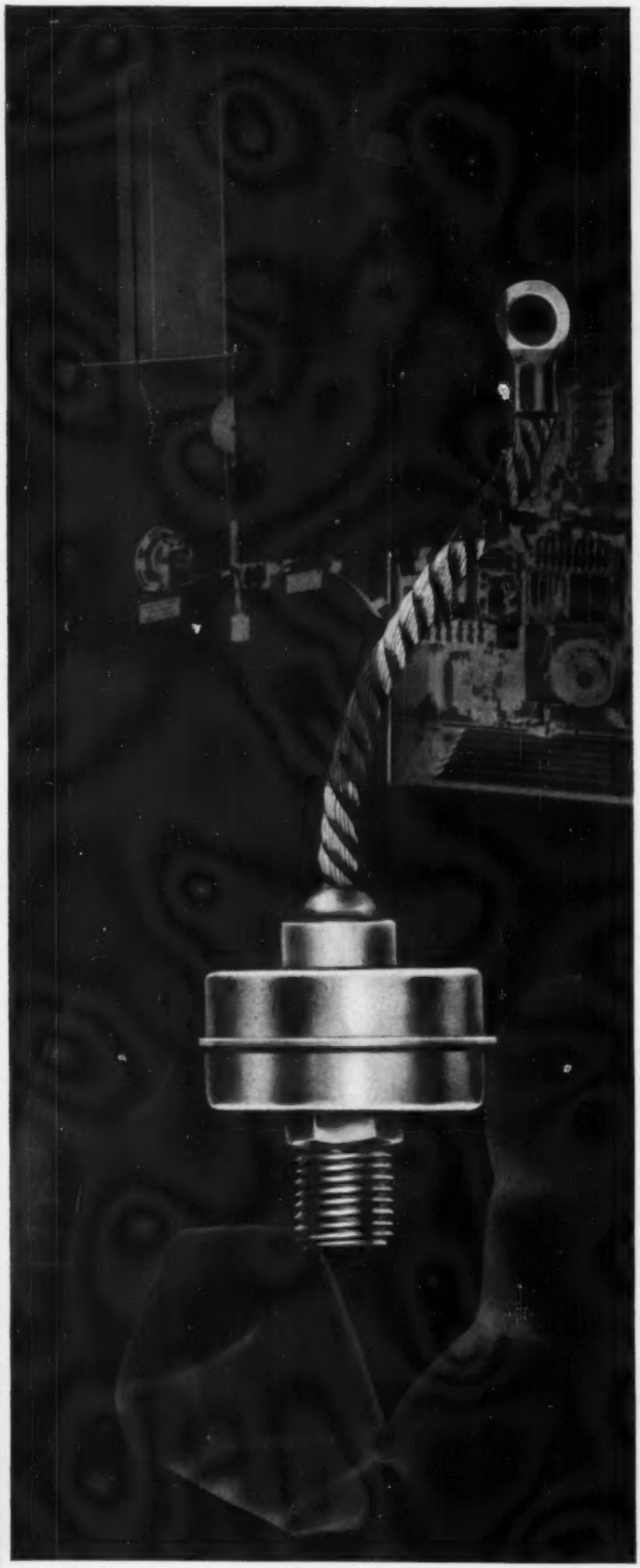
Among facts revealed in "Who Profits from Profits?" are these: "business paid for wages and salaries, pensions and for insurance, and for all other employe compensation in 1958, 253.8 billion dollars. Twelve million shareholders in American business received less than a 20th of that amount."

The color-slide presentation available from the Chamber runs 15 minutes, and one can read a script of "Who Profits from Profits?" or play a tape as he looks at the slides. The slides, according to the Chamber, show basic economics.

The presentation is described as practical for student groups, teachers, employe groups, civic and service clubs, and chambers of commerce.

A copy of the script is free. For the 35mm slides that illustrate the script, and for a tape recording of it, the prices are $8.50 for a set of 31 slides, and $5.00 for a tape.

Write: Business Relations Department, Chamber of Commerce of the United States, 1615 H St. N. W., Washington 6, D. C., for "Who Profits from Profits?"



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A magnetic amplifier charging regulator without moving parts helps assure you of consistent voltage regulation within ±1% all the way from *zero* to full load current at the float voltage setting. This includes the particularly important 0 to 15% range.

26 models cover all standby battery applications in the telephone field. Write for more information on the one that suits your application to: Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

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This Complete Unit Can Be Leased for ONLY $64.50 per Month under our program.

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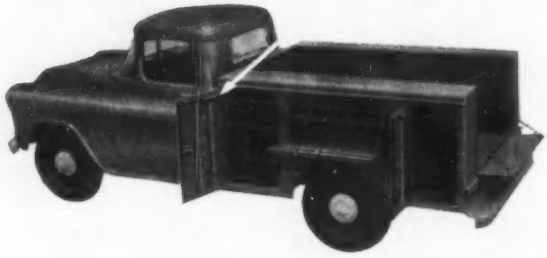

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The Operator's Corner

By **MAYME WORKMAN**
TELEPHONY's Traffic Editor

ALEXANDER GRAHAM BELL is so well known as the inventor of the telephone that even during his own lifetime, few realized that Mr. Bell's true dedication was to one cause —to bring sound and education to the deaf.

In a recent issue of "THE HEARING DIGEST," Charles V. Weatherton gives the following interesting report about Alexander Graham Bell, some of which may be unknown to telephone folk, such as, his method of answering the telephone by saying, "Hoy! Hoy!"

"'Mr. Bell will be with you in a moment.' I was about to speak to the great Alexander Graham Bell, inventor of the telephone, a living legend known to every schoolchild in America. It would be nice if I could say that, despite my youth, I was calm and composed. Nothing, however, could be further from the truth. I was awe-struck. And to make matters worse, I was going to speak to him by *telephone*, Mr. Bell's own invention.

"I waited in a state of barely controlled panic. Someone picked up the telephone at the other end of the line.

"A very clear voice said, 'Hoy! Hoy!'

"The last trace of composure left me; I was speechless. After a few seconds the same clear voice repeated, 'Hoy! Hoy!' Frantically, I decided that this must be the way that Alexander Graham Bell answered the telephone, and in a voice that was almost a shout I called back, 'Hoy, Hoy, Mr. Bell!'

"The guess had been correct. Mr. Bell proceeded to put me at ease and answer my questions, starting with the admission that he always answered the phone in that manner, since he felt the exclamation was more euphonious than the conventional 'Hello.'

"This conversation took place in 1916, the year that I broke in as a reporter on the now defunct *Boston Transcript*. One of my first assignments was to gather material for an article commemorating the 40th anniversary of the invention of the telephone, and with the brashness of youth, I decided to go directly to the source and do a series of interviews with Mr. Bell himself. I called his residence daily, explaining my project, and daily received the courteous but firm reply that Mr. Bell

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SHERRON STEEL PHONE BOOTHS
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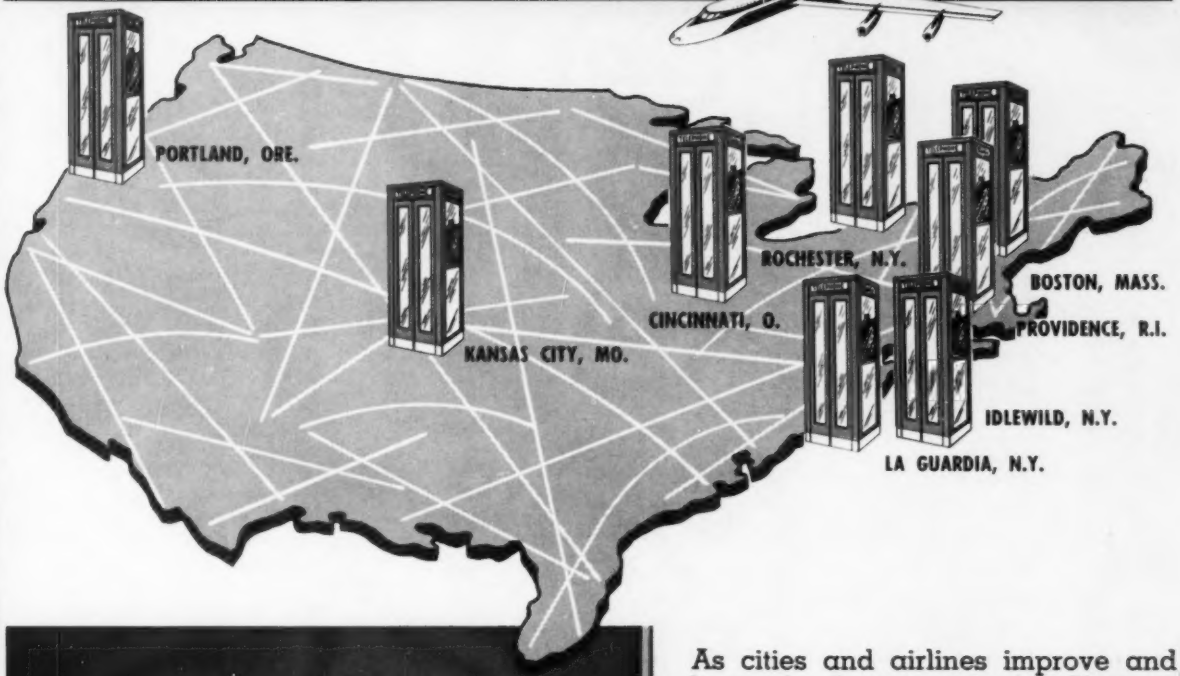

As cities and airlines improve and beautify their terminals, Sherron phone booths are being chosen by telephone companies as eminently in keeping with the architectural motif and interior decor. This applies equally to Sherron's bright, enduring stainless steel models as well as those in clean-lined, colorful steel.

A vitally important consideration in the preference for Sherron steel booths is their standardization . . . which makes possible single or multiple booth installations, acoustic or See-thru, free-standing or recessed, to fit just about every conceivable space condition.

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SEMI-RIGID JUMPER WIRE
TESTED 5 WAYS FOR BUILT-IN QUALITY
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SPECIFY When you specify Alphaduct Semi-Rigid Jumper Wire, or any one of Alphaduct's different types of telephone wire—you buy the know-how of the recognized leader in the manufacture of insulated wires for the Independent Telephone Industry.
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National Distributors: Automatic Electric Sales Corp., Northlake, Ill. • Leich Sales Corp., 427 W. Randolph St., Chicago, Ill. Regional Distributors: Buckeye Telephone & Supply Co., Columbus, Ohio • The Lindsay Telephone Supply Co., Cleveland, Ohio • Pankey Supply Co., Charlottesville, Va.

was busy at the time and not available to the press. Later, I was to learn that this remarkable man was, in truth, one of the busiest people who ever lived, constantly engaged in experiments and research, even to the time of his death. I persisted for over a week, however, and finally was told that if I would call the next day, Mr. Bell would grant me an interview.

"In that first rather hectic conversation, and in several subsequent interviews, I was to learn a great deal about the man behind the Bell legend. But one fact stands out above all; even if Alexander Graham Bell had never invented the telephone, his place in history would still be secure. In fact, it was Bell's ironic fate to see his invaluable life's work largely forgotten, while a grateful world conferred countless honors upon him for an invention that he thought of as simply a useful by-product. Even during his own lifetime, few realized that Alexander Graham Bell's true dedication was to one cause; to bring sound and education to the deaf.

"In a very real sense, Alexander Graham Bell was born to his work. Both his father and grandfather were authorities on speech and speech therapy in their native Scotland. His father, Alexander Melville Bell, developed 'Visible Speech,' a lip-reading system that classified speech sounds according to the shape that the mouth assumed to make different sounds. This method is widely used today in the education of deaf children, and it was to deliver a lecture on Visible Speech that Alexander Graham Bell first visited the United States.

"Among those who heard young Bell lecture on this initial visit was a teacher named Sarah Fuller. This devoted woman was the principal of the world's first day school for the deaf, founded by the Boston School Board in 1869, and she promptly asked Alexander Graham Bell to join her faculty and introduce his Visible Speech method in Boston. Bell accepted, and in April 1871, at the age of twenty-four, he took his place on the faculty.

"So effective were Bell and his fellow teachers that it is difficult today to imagine the background they worked against. When Bell joined the Boston faculty, there were only four speech schools in the entire United States, with a total enrollment of 140 pupils. The vast majority of the deaf were left unaided, in silence. Deaf children remained unschooled and ignorant. Deaf mutes were considered to be feeble-minded. Many religious leaders held to the belief that teaching speech to a deaf mute was flouting the will of the Lord. Bell's teaching theories, now

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Fills voids in splice bundle in a matter of seconds . . . provides foundation for subsequent tape layers . . . a ⅛-inch thick insulating compound in tape form that can be molded by hand to comfirm to irregular shapes and contours.

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No. 1 (7-mil) and No. 2 (10-mil) is used for final abrasion-resistant covering. A thin, tough, resilient, pressure-sensitive tape with great adhesive strength. Also popular as an all-purpose tape for general splicing jobs.

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accepted as standard, were then deemed radical and, in some quarters, dangerous.

"The remarkable progress made by Bell's students, however, gradually dispelled doubts. In 1873, at the age of 26, he became professor of Vocal Physiology and Mechanics of Speech at Boston University, and that same year, in order to teach the growing number of deaf children who were seeking help, he opened his own school for the deaf.

"The father of one of his students was Thomas Sanders, whose son had been born deaf. So grateful was he for Bell's instruction of his son that he offered to pay the costs of Bell's experiments with electrical hearing devices, and in 1877, when the Bell Co. was formed, Thomas Sanders was its first treasurer.

"Another pupil was Mabel Hubbard, a shy young heiress who had been deaf since early childhood. Mr. Bell, the teacher, soon became Alexander, the suitor, and on July 11, 1877, Mabel Hubbard and Alexander Graham Bell were married.

"A long and happy marriage, world-wide fame, and great wealth from his telephone and other inventions—all this good fortune came to Bell. Yet despite his success with other inventions, he remained steadfast in his determination to use the miracle of electricity to bring sound to the deaf. A few years before his death he patented the audiometer and—for him, the greatest of all his inventions—the electric hearing aid.

"Alexander Graham Bell did not live to see the widespread use of the electric hearing aid. On Aug. 2, 1922, he died at his summer home retreat in Nova Scotia, his great work accomplished, but its benefits to the hard-of-hearing still barely tapped. Today, however, literally millions of people hear and learn and understand, thanks to the miracle of the electric hearing aid, the achievement of a dedicated life."

And so we learn that the man who gave the telephone to the world had other dreams and ambitions which he lived to realize. Truly, we owe a debt of gratitude to Alexander Graham Bell for the wonderful gifts which have made life more pleasant and satisfying to millions of people.

Traffic Questions

(1) Are credit card calls accepted from any telephone?

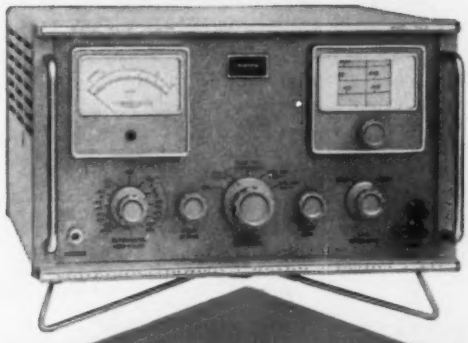
(2) On what basis are credit card calls issued?

(3) What does a credit card number consist of?

(4) On credit card calls, should time

(Continued on page 58)

New performance
New design
New appearance



TUNABLE, dual selectivity
plus
Flat VTVM feature

Sierra Model 125A

FREQUENCY SELECTIVE VOLTMETER

Model 125A is an all-new vacuum tube voltmeter incorporating features of several previous Sierra instruments in one compact, high-performance instrument.

Covering the frequency range of 3 to 600 KC, this new voltmeter has both narrow and wide selectivity settings plus a flat voltmeter position. This triple mode measurement capability makes the Model 125A an extremely versatile instrument for carrier measurements, wave analysis and general laboratory use. Brief specifications are listed at the side. For full information and demonstration, call your Sierra representative or write direct.

SPECIFICATIONS

Frequency Range
Tunable Mode: 3 KC — 600 KC
Flat Mode: 1 KC — 600 KC

Measurement Range
Tunable Mode: –90 dbm to + 32 dbm
Flat Mode: –30 dbm to + 32 dbm

Selectivity
Narrow: down 3 db 125 cps off resonance
down 45 db 500 cps off resonance
Wide: down 3 db 1.25 KC off resonance
down 45 db 5 KC off resonance

Construction
Modular with etched glass epoxy circuit boards

Data subject to change without notice

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Are you planning a dial conversion? Then get in touch with us. We've helped hundreds of telephone companies to solve their dial conversion problems. We'd like to do the same for you. Just write Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

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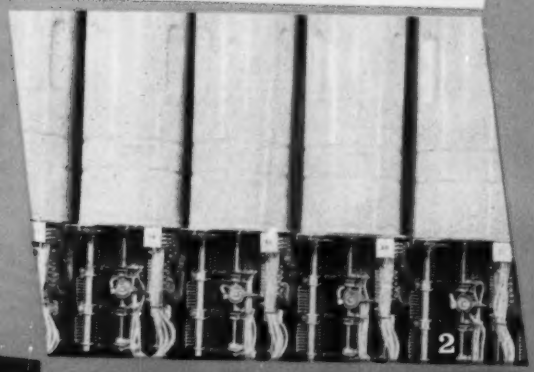
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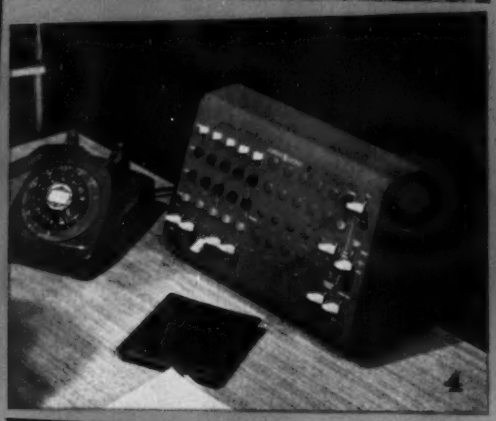
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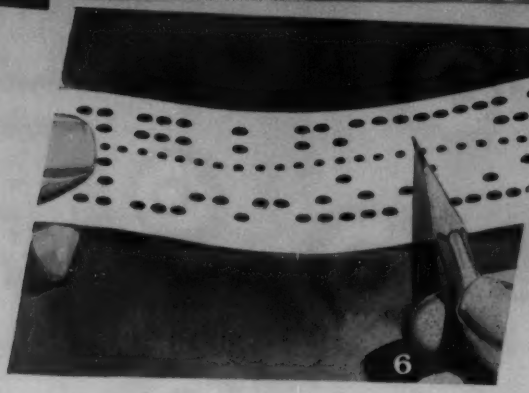
6

1 Modern dial phones. AE has a complete line of instruments to meet the needs of any residential or business subscriber in your area.

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4 P-A-B-X systems. When you convert an exchange, your PBX subscribers will want to change to dial. AE offers you stock delivery on six P-A-B-X models. And, there's a choice of 16 auxiliary services to meet special needs of your customers.

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6 Automatic Toll Ticketing. The simple circuits and unitized construction of Strowger equipment permit it to be adapted quickly and economically to provide automatic toll ticketing. And, Strowger equipment works directly into accounting machines, without converters.

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Model TBM Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance.
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be called, or charge quoted on coin or attended public telephone calls?

(5) On a credit card call, if the called party asks that a collect call be billed as a credit card call, how does the operator proceed?

(Answers are presented on page 88)

Bell Studies Ways People Locate Sound

Bell Telephone Laboratories are conducting research into the ways people locate the direction of sound. Practical results of the recent "double dome" research at Murray Hill, N. J., may be the improvement of stereophonic radio and TV programs, which are transmitted nationwide over telephone facilities.

In the experiments, two microphones in the ears of the dummy, "Oscar II," were substituted for human ears. Oscar's head reproduced the "shadowing" of sound by a human head. Persons participating in the tests—such as Mary Lou Hartig, shown on the front cover—wore the extra head so that motions of their heads would be reproduced, for even very small movements influence hearing.

The natural sounds received in each microphone were altered electronically by acoustics scientist, R. L. Hanson, (right in cover cut) and were delivered to the earphones. Listeners were asked to point to the apparent direction of the altered sound. Normally, the ear that is closer to a sound hears it earlier and louder than the other ear. Here, however, artificial differences in time delay and intensity were introduced, and it was found that the factor of intensity is more important than previously believed. If sound reaches one ear first but reaches the other ear somewhat louder, the hearer is completely confused.

The experiments were conducted in a "dead" room—one with sound absorbent walls—so that reflections would not affect the results. "Oscar II" is a second-generation scientific dummy: "Oscar the First" was a full-sized tailor's dummy used in pioneering stereophonics at Bell Laboratories and was demonstrated at the Century of Progress Exposition, Chicago, in 1933.

Basis of Production

"What capital does for production is to afford the shelter, protection, tools, and materials which the work requires, and to feed and otherwise maintain the laborers during the process. Whatever things are destined for this use—destined to supply productive labour with these various prerequisites—are Capital."—JOHN STUART MILL, *The Principles of Political Economy.*

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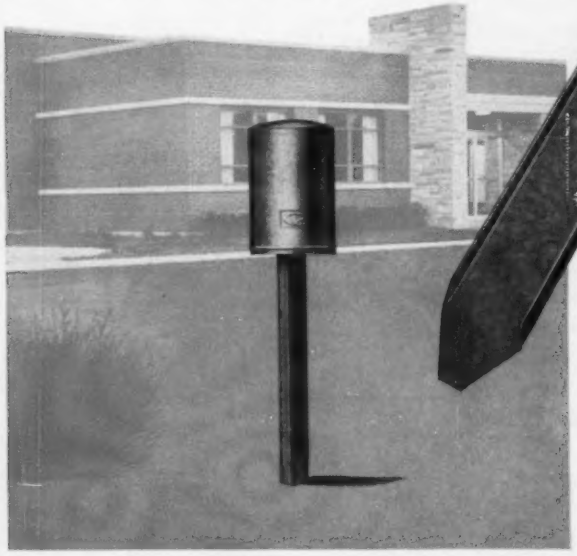

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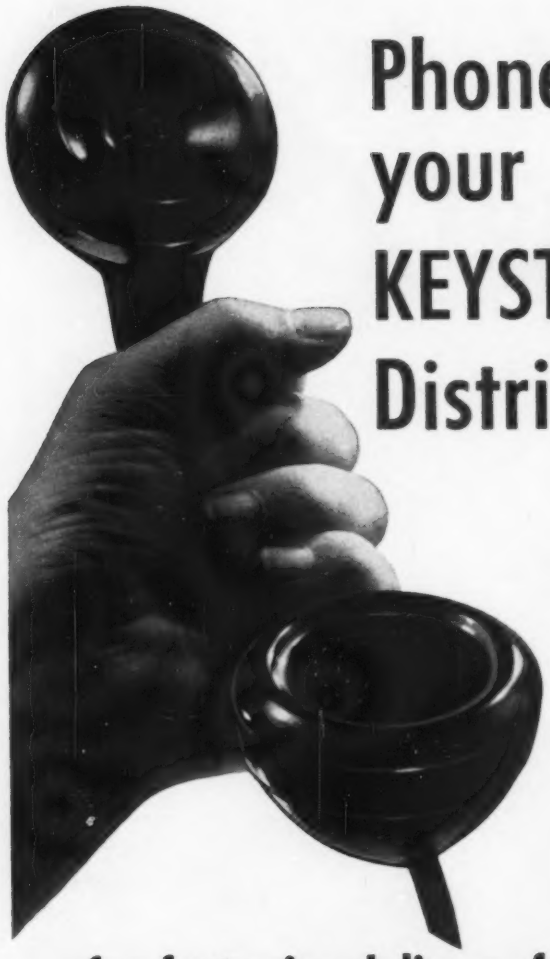

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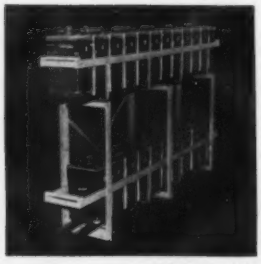

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For battery details, send for new C & D Bulletins T-532 and T-533. Your C & D representative or telephone equipment supplier will be glad to discuss your specific battery requirements.

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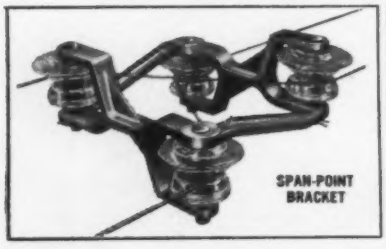
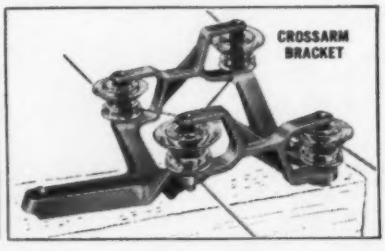




T. O. P. TOPICS

Continued from page 36

schedules are prepared. In offices where an entirely separate Saturday schedule is not required, the basic schedule may be used with perhaps different supplementary tours.

Proper Distribution of Time

All this sounds very complicated indeed, but the purpose of force adjustment is to provide just the right amount of employe time, properly distributed, to handle the traffic.

Force adjustment permits us to buy employe time, and use it effectively, from each employe every day in an orderly fashion.

Of course, load planning is only a guide. It reflects what has been done in the past, so it should not be used as a "ceiling" for load-carrying possibilities. It is a basic starting point, an average expectation. But who wants to be just average? Use this guide as a take-off point—reach for higher loads by increasing individual productivity.

Develop load potential and create a top-notch force. Don't be satisfied with less. Get the most for your money!

Americans' Dream

Far from reporting the cynical theory that if we changed from 40-billion-dollar defense budgets, a depression would result, *The Nation's Business*, after doing some research, presents the following refreshing outlook geared to a softening of cold war pressures. There would be:

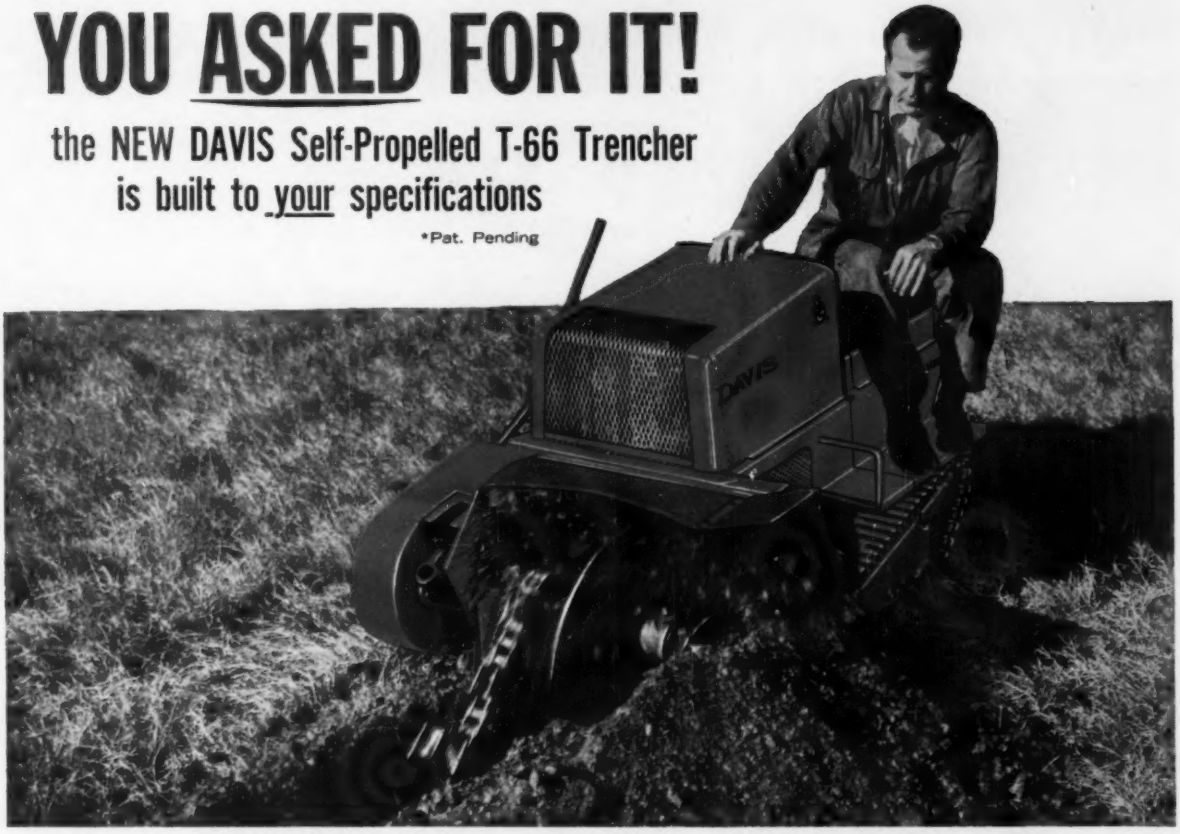
"A rise in consumer spending far exceeding the cut in defense spending.
"A terrific upsurge in spending for new plants and equipment.
"More income for everyone to spend and invest.
"Higher living standards.
"Lower taxes.
"A larger labor force."

And, in answer to the question of who would be hurt by a decrease in phenomenal spending, *Nation's Business* adds that industry and individual hurts would be only temporary, and soon everyone would be wondering how we ever paid such high taxes and denied ourselves so many of the benefits our productive capacity makes possible.

YOU ASKED FOR IT!

the NEW DAVIS Self-Propelled T-66 Trencher is built to your specifications

*Pat. Pending



features POSITIVE TRACTION...HYDRAULIC VARIABLE SPEED DRIVE
CONVENIENT CONTROLS...VIRTUALLY EFFORTLESS OPERATION

DOES IT S OWN BACKFILLING

The Davis T-66 has a low-cost, well-designed, hydraulically controlled angle backfill blade. The T-66 has two-speed drive with instant forward or reverse, powered steering, independent left and right positive clutches and disc steering brakes for maneuverability in backfilling operations.

The new, self-propelled, crawler-type Davis T-66 is the most advanced utility trencher available. It's designed and produced after an exhaustive survey revealed the features users really wanted. Every one of its 1350 pounds is packed with performance to handle 9 out of 10 jobs with amazing efficiency and economy; yet, it's priced much less than you would expect.

Positive traction, accurate speed control, hydraulic variable speed drive, hydraulically operated boom, preloaded shock-absorbing boom, convenient — virtually effortless — control, and compact design (only 37" wide) are just a few of its 33 profit-producing features.

It digs 3" to 4" wide to 66" deep or 12" wide to 30" deep, and at varying depths and widths in between. It trenches from 1-ft. to 12-ft. per minute depending upon soil conditions. Only **two** different **tooth combinations** are required to **handle all digging widths.** The Davis T-66 is quality built in every part.

ASK ABOUT ITS 90-DAY UNCONDITIONAL GUARANTEE

the DAVIS PUP TRENCHER digs by itself!

Digs where others fail because it's self-propelled by positive, 6-speed winch drive. Digs 2" or 3" wide to 36" deep; 4" wide, 18" deep. Proven to be profitable. Low cost.

the DAVIS HUSTLER UTILITY TRAILER

Designed to carry T-66. Versatile for many uses. Has 2000 lb. capacity, 48" x 84" deck, low center of gravity and load equalization regardless of load distribution.

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Please send me literature and name of my distributor on the Davis T-66____ Davis Pup____ Davis Hustler Utility Trailer____.

NAME _____

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TOWN _____ STATE _____

T6-60-2

Eight REA Loans, Totaling $3,158,000, Authorized

EIGHT TELEPHONE loans approved during the week of Apr. 4 by the Rural Electrification Administration will help in enabling borrowers in five states to extend or improve telephone service to 5,541 subscribers, the U. S. Department of Agriculture has announced. Over 65 per cent of these subscribers will receive telephone service for the first time.

Loan funds, totaling $3,158,000 were approved as follows:

Farmers Mutual Telephone Co., Shellsburg, Ia.; $179,000; Apr. 4.

This loan will help to improve service for 277 existing subscribers and to furnish initial service to 92 subscribers.

The borrower intends to acquire, through abandonment, the facilities of the Urbana Mutual Cooperative Telephone Co. which is presently providing magneto service to the existing subscribers. It plans to construct a new dial central office at Urbana. The subscribers now being served by Urbana will take service with the borrower when this work is completed.

REA loans to the Farmers Mutual company now total $307,000. Upon completion of all construction provided for under the loans, the borrower will be operating two dial exchanges serving 807 subscribers. The dial exchange at Shellsburg is in operation.

•

Citizens Telephone Co., Leslie, Ga.; $503,000; Apr. 6.

Funds will be used to aid in furnishing initial service to 575 subscribers and improved service for 566 subscribers. The existing subscribers now receive dial service from the Vienna Telephone Co. The borrower plans to acquire this company and to retain and expand the existing Vienna dial facilities.

The $836,000 in REA loans approved to this borrower thus far, will enable it to furnish new and improved service to 1,873 subscribers. The system, when complete, will consist of four dial exchanges. Three of the exchanges are in operation.

Home Telephone Co., Inc., Moncks Corner, S. C.; $444,000; Apr. 6.

This loan will help to provide telephone service to 913 new subscribers in the Moncks Corner and Jamestown areas. The funds will also aid in enabling the borrower to furnish extended area service between the borrower's Harleyville exchange and the St. George office of Southern Bell Telephone & Telegraph Co.

Upon completion of planned construction, the borrower will be serving about 2,776 subscribers from four dial central offices.

•

Eastex Telephone Cooperative, Henderson, Tex.; $312,000; Apr. 6.

Funds will be used towards furnishing initial service to 282 subscribers and improving service for 172 subscribers. The existing subscribers now are served by the Goodrich Telephone Co. and the General Telephone Co. of the Southwest's Coldspring exchange. The cooperative plans to acquire these two exchanges and build a new dial central office at Coldspring.

The $2,015,082 in REA loans approved to this borrower thus far will enable it to improve or extend service to 3,698 subscribers. The system, when complete, will consist of 15 exchanges, 10 of which have been cut-over to modern dial operation.

•

Poka-Lambro Rural Telephone Cooperative, Inc., Tahoka, Tex.; $413,000; Apr. 6.

This loan will help to provide telephone service to 401 new subscribers. The funds also will enable the borrower to construct a new dial central exchange building at Union, and to purchase and remodel a building in Tahoka for use as a headquarters facility.

Toll and operator office services for the Union exchange will be provided by the Brownfield office of the General Telephone Co. of the Southwest. Extended area service will be provided between Union and Brownfield.

REA loans to this borrower now total $2,405,000. Upon completion of all planned construction, the Poka-Lambro cooperative will be serving an estimated 2,534 subscribers from 15 dial exchanges. Thirteen of the exchanges are in operation.

•

Four States Telephone Co., Brownwood, Tex.; $605,000; Apr. 6.

These funds will aid in enabling the borrower both to improve service for 526 subscribers and to furnish initial service to 734 subscribers in Louisiana. The existing subscribers now receive dial service from the Oberlin, Ragley and Reeves, La., exchanges owned and

new!

TERMINAL FITTING —HOUSING FOR FIVE CONNECTORS

Used with the Bell System Call Director Telephone, Wiremold's 2857T Terminal Fitting effectively provides an ideal housing for cable connectors. Of rugged diecast aluminum, it can be mounted on floors, walls, desks (side or kneehole).

For away-from-wall locations, Pancake 2800 Overfloor Duct is the neat way to house and protect the cable. Fitting and duct both hold 100- or 75-pair cable.

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operated by the Southwestern States Telephone Co. The borrower proposes to acquire these exchanges together with 19 miles of outside plant in the Turkey Creek exchange also operated by Southwestern States.

The borrower plans to construct dial offices at Oberlin and Turkey Creek. The existing dial facilities at Ragley and Reeves will be expanded and used in place.

REA loans to this borrower now total $2,205,000 which will make possible new and improved service to 3,930 subscribers in Texas, Arkansas and Louisiana. The completed system will consist of six exchanges in Texas, three in Arkansas and four in Louisiana.

•

Nelson Telephone Cooperative, Durand, Wis.; $279,000; Apr. 6.

This loan will help to improve telephone service for 380 existing subscribers and to provide initial service to 45 subscribers.

The borrower proposes to acquire with loan funds the Gilmanton & Dover Farmers Telephone Co. and the Modena Cooperative Telephone Co., Inc. The Gilmanton & Dover company provides magneto service to 254 subscribers from a central office at Gilmanton. The Modena company provides magneto service to 96 subscribers from a central office in Modena. The subscribers who will get improved or initial service under the loan are located in the Modena-Gilmanton areas.

Construction of a central dial office at Gilmanton to serve subscribers in both areas will be financed by the loan.

REA loans to this borrower now total $1,041,000. Upon completion of all construction provided for in the loans, the borrower will be operating four dial central offices serving 2,066 subscribers.

•

Pembroke (Ga.) Telephone Co.; $423,000; Apr. 7.

Funds will be used to serve 578 new subscribers. This new REA borrower, which is now serving 360 subscribers also plans to construct a new headquarters building at Pembroke.

Gerald C. Bacon is president and Mrs. Ivey Beardslee is manager of the Pembroke company.

Cultivate Awareness

"The gravest events dawn with no more noise than the morning star makes in rising. All great developments complete themselves in the world, and modestly wait in silence, praising themselves never, and announcing themselves not at all. We must be sensitive and sensible, if we would see the beginnings and endings of great things. That is our part."—BEECHER.

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WB TELEPRENE® Drop Wire
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- Cuts neat trenches—easy back-fill.
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well worth investigating

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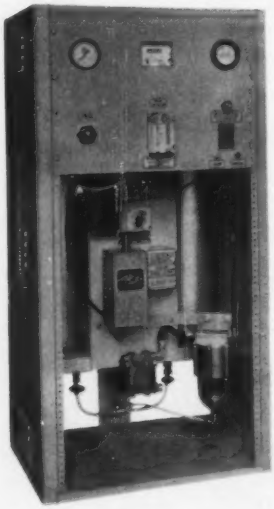
MODEL A
Air Compressor Dehydrator



Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 30 cables. The unit is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.

- Completely automatic in operation
- Air Purifier to eliminate oil mist
- Incorporates the latest safety devices

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FIRST WITH CBCD

Continued from page 29

overtime charges, collects the charges, and releases.

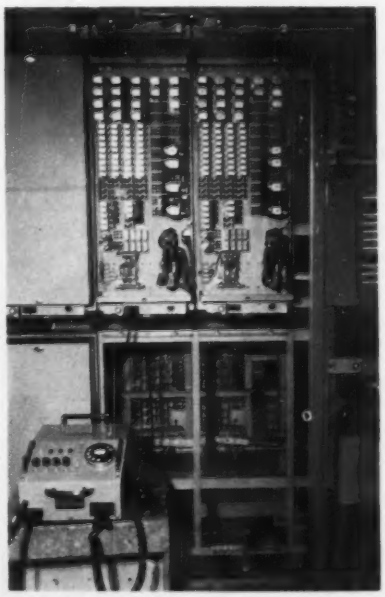
A coin box call from a sub-office is handled in the same way, except a collector is seized via a special Auto-Auto CLR Trunk and two-wire facility to the main office.

The quantities on the trunking diagram were included to increase the reader's understanding of how the various pieces fit together. The quantities shown represent the requirement for the San Fernando exchange with an AB toll calling rate of 0.53 (hundred circuit seconds) ccs per station from 1,300 paystations.

Actually, the San Fernando installation was engineered for an anticipated higher calling rate and a greater number of paystations; hence more than 50 Collectors were installed. Since the Collector Hunters associated with the Fee Trunks can hunt over only 50 Collectors, the Fee Trunks and their Collector Hunters must be divided into two groups. This, of course, requires the number of trunks for each group to be computed separately.

The equipment has the same general appearance as SATT equipment. The Collectors, Resenders, Initial Fee, and Overtime Fee Trunks are all removable. These jack-in units are physically large; however, the convenience of being able to remove them for maintenance purposes overshadows their bulk.

The cordless operator positions are similar to those used for CKO (Check-



Close-up of CBCD equipment showing Resenders.

Rex

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TO R.E.A. PE-23 SPECIFICATIONS

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. . . and that's no joke where phone cord serviceability is concerned.

Maximum stretch and positive retractability mean carefree installations over the years when you select COMCO Spiraflex Cords for your handsets. Quality-built inside and tough-jacketed with rugged P.V.C. in your choice of ten decorator colors or black, they are perfect for any type service, any surroundings! Available in standard or extra lengths (10, 15 and 25 feet). But, see for yourself by putting a sample cord on your own phone. Prompt delivery assured!

Call COMCO for all your cord requirements

Popular Spiraflex is only one of the complete quality cord line COMCO is ready to supply. In addition, there are Nylon Jacketed Switchboard cords in four colors and operator cords in black or brown, plus black or colored P.V.C. jacketed receiver and deskstand cords, patch cords, transmitter cords, test cords, extra length cords and cords for inter-communication systems . . . all can be yours from COMCO.

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COMMERCIAL CORD COMPANY, INC.

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AUTOMATIC ELECTRIC SALES CORP.
Northlake, Ill.

ing Operation) positions associated with Type 59 SATT Systems. Each is equipped with Accept Key, Release Key, Ring Key, Coin Control Key, and Overtime Trunk Keys together with suitable supervisory and pilot lamps. The display lamp panel uses 32 lamps: 12 for the rate and 20 for the overtime minutes. The display lamp caps are of a new raised plastic design similar to the buttons on the key-phones we use every day. Since the whole lamp cap is illuminated the numbers are easy to read.

When a switchboard position is used for CBCD an Accept and Release Key are added for Initial Fee Service. Overtime Trunks are terminated on regular line jacks, and they are handled using the regular cord circuit with associated Ring, Talk, and Coin Control Keys. The call waiting lamp and display lamps are mounted on the face of the switchboard.

The choice of using the special cordless positions or equipping existing toll positions offers the flexibility required for varied traffic conditions. At San Fernando, the cordless positions are used during the day and the switchboard in the late evening.

It is too early to verify the savings expected with the use of CBCD. The installed cost of the equipment is known, but other factors such as maintenance and future traffic volumes are unknown. The results of the first traffic study taken January 11 to 14, are shown in *Table 1*.

California Water & Telephone Co. is proud that its CBCD installation at San Fernando is the first to be installed by an Independent company. Besides reducing operating costs, it should enable our customers to complete calls speedily and efficiently. Our customers are certainly aware that the idea is new. We hope they like it.

ABC OF THE TELEPHONE

Continued from page 23

of the wires being installed. The other wires—like the test span—should be pulled up to greater tension and less sag, then backed off to proper sag. In most instances, the sag of the remaining wires can be gauged by eye to provide the required sag. This, of course, applies only to the section of line being pulled when the sag and tension measurements are made. The complete procedure should be repeated as each section of line is pulled to the specified sag and tension.

Effect of Temperature

Copper or steel expands as temperature rises and contracts as temperature falls. Quite often, expansion is thought of as a radial change or, in the case of an open wire, as change in diameter. This does occur. However, the most noticeable change in an open wire line is the change in length under normal temperature variations.

The data for the spans covered in *Table 1* shows there is a considerable difference in the amount of sag at 0° F as compared with 90° F. There is a difference of 11 inches in a 250-foot span. For a 510-foot span the difference is 31 inches. The sag of the shorter span at 90° F is a little less than double the sag at 0° F. The sag of

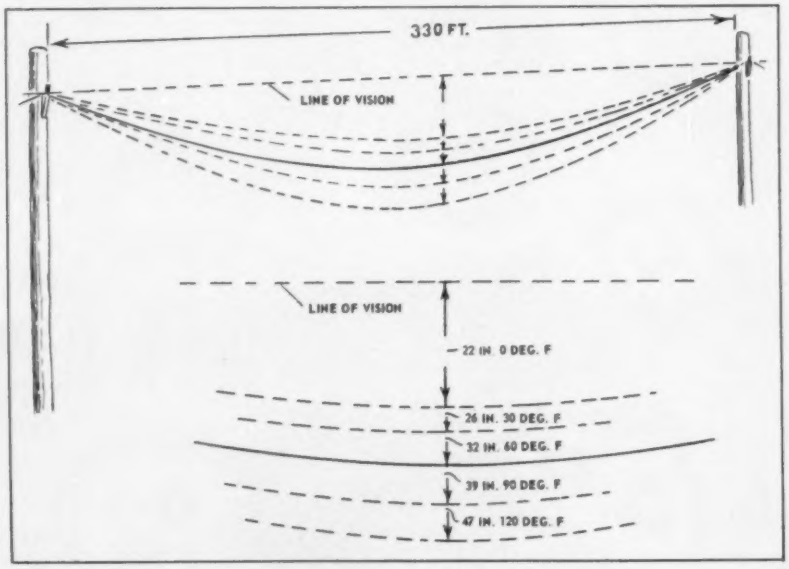


Fig. 9

SERIES 22

SERVICE AND MAINTENANCE BODIES

Four Models . . . Four Sizes

COMPARTMENTIZED TO FIT SPECIFIC JOB NEEDS

Which Series 22 Body do you need? Take a look . . . there's a model especially designed for your particular type of service work. The durable, all-steel unit shown above, equipped with an optional overhead rack, is widely used for general service work in all operations. Other models for electric, telephone and gas service have similar compartments fitted with various shelves and bins to meet specific work needs. Result: You get a custom-made body at a mass-produced price . . . plus increased crew efficiency on every job.

Series 22 Body features include flat, 16-gauge compartment tops . . . rust-proof, cadmium-plated door latches . . . nylon bushings in all door hinges . . . key-locking, weathertight doors . . . recessed, slam-action door catches . . . corrugated steel floor.

Available in 75", 90" and 104" lengths, equipped with accessories to fit your particular need.

Need more storage space? Any of the four Series 22 models can be furnished with an all-steel superstructure. In addition to any optional items desired, the superstructure is fitted with two full-length shelves and three swivel hooks on each side, a window in the head panel and grab handles at the rear.

Self-Elevating Ladder Assembly

This time-saving assembly with six rubber-covered rollers and four powerful coil springs enables one man to quickly and effortlessly erect a ladder up to 36′ in length. The operator lightly pushes the end of the ladder down, and the springs do the lifting. Stowing is equally fast and easy. Ideal for use on 75", 90" and 104" bodies. Includes 28′, 30′, 32′, 34′ or 36′ two-section extension ladder.

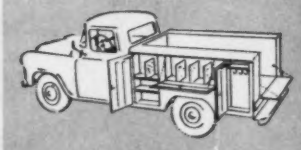
FOR ELECTRIC WORK

Series 22-E. Designed for service work in any phase of the electric utility industry. Special shelves and bins carry all the equipment and materials needed in the field.

FOR TELEPHONE WORK

Series 22-T. Compartmentized to carry a variety of telephone service tools, parts and materials. Standard arrangement of shelves and bins enables crewmen to quickly find items needed on the job.

FOR GAS WORK



Series 22-G. Two variations of this model are available for carrying either cast or tin meters. Rubber-padded compartments insure the safe storage of fragile parts and instruments.

Plenty of additional bins, shelves and racks carry tools, pipe, fittings, parts and all other equipment needed on routine or emergency service and maintenance calls.

Another reason why
UTILITIES EXPECT MORE FROM

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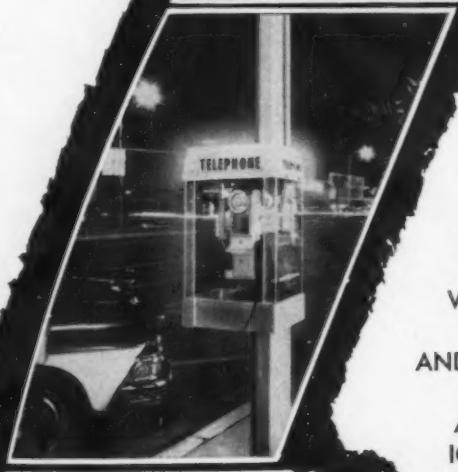

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the longer span changes about 65 per cent at the two temperature extremes. The sag variations for a typical 330-foot span at various temperatures are shown in *Fig. 9*.

Although the end result of temperature change causes the same changes in various length spans, the amount of sag does not follow a straight rule-of-thumb formula. The best way to be sure of the correct sag is to follow the specifications for the wire being used.

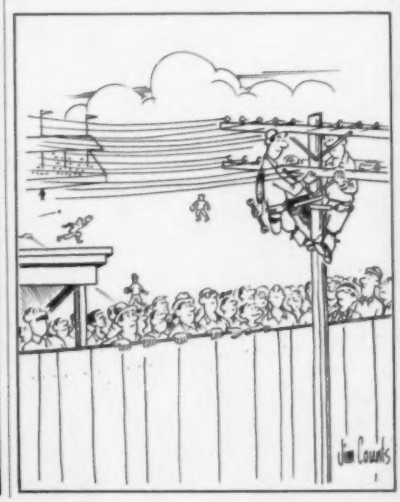
A reliable thermometer should be used to determine the temperature at the time the sag is being established. Temperature changes are usually gradual and the open wire in the spans responds readily to these changes. Thus, the temperature of the air, as measured with an ordinary good quality outdoor thermometer, is the controlling factor in determining the amount of sag to be provided when the wire is installed.

More than one type or size wire may be used on the same pole line. In most instances, the specifications for the various wires will call for different sags and tensions. The line would look unsightly and chances of crosses in the spans would be greater if the spans were installed strictly in accordance with the sags recommended for each type wire. The most satisfactory solution is to sag all the wires in accordance with the conductor requiring the greatest amount of sag.

(To Be Continued)

Bitter and Sweet

"There is a certain relief in change, even though it be from bad to worse; as I have found in traveling in a stage-coach, that it is often a comfort to shift one's position and be bruised in a new place." — WASHINGTON IRVING, *Tales of a Traveller.*



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★ Steel case assemblies available for manhole mounting and direct earth burial.

TYPE C124 LEAD CASES

Equipped with Types 632 (88MH), 638 (44MH), 642 (88MH) or 641 (44MH) coils. Contain 4 to 76 coils—lead or plastic stubs.

TYPE C125 STEEL CASES

Equipped with Types 632 (22MH), 638 (44MH), 642 (88MH) or 641 (44MH) coils.

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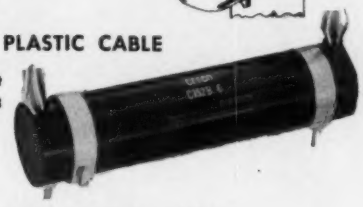
TYPE 167 CASE FOR LEAD CABLE
TYPE 162 CASE FOR PLASTIC CABLE

Using one to sixteen Type 632 (88MH), 638 (44MH), 642 (88MH) or 641 (44MH) coils.

TYPE C152 CASE FOR PLASTIC CABLE

Sizes — One to twenty-eight coils. Using Types C652 (88 MH) or 651 (44MH) coils.



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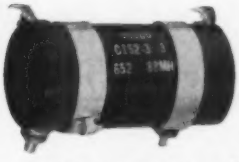
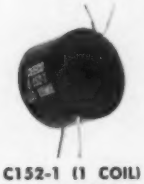


C152-3 (3 COILS)



C152-1 (1 COIL) "BOLT MOUNTING"

TYPE C152 CASES

Are equipped with one to 26 type 652 (88 MH) or 651 (44MH) coils. For mounting in splicemaker cases and terminals.

PARKWAY TERMINALS FOR LOADING DIRECT BURIED PLASTIC WIRE & CABLE

LUG-12 TERMINAL FOR BURIED PLASTIC CABLES

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★ Pole Brackets—Available for pole mounting.
★ Loading—Load one or more pairs as required.
★ Accessible—For testing, splicing, cross connecting and subscriber distribution.
★ Economical—Buy only what you need —add later.

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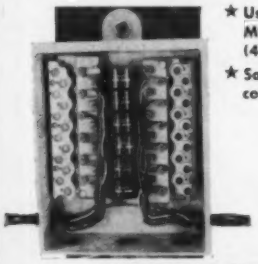

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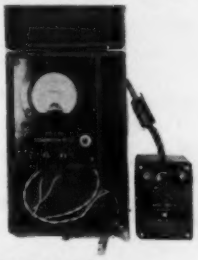

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Courts and Commissions

Require Filing of Exchange Area Maps in Nebraska

Every telephone company in Nebraska was directed on Apr. 1 by the Nebraska Railway Commission to file exchange area boundary maps for each exchange operated in the state. The maps are to be on file with the commission on or before Mar. 31, 1961.

The commission's general order No. 96 further provided that:

"Any change in the exchange area boundary between two exchanges, both of which are owned by the same telephone company, shall be reported on or before Mar. 31 of each year showing the exchange area as of the first day of the preceding January.

"Any change in the exchange area boundary between two exchanges that are not owned by the same company shall be approved by the commission, and a revised map shall be filed by all companies involved, on or before Mar. 31 of each year, showing the changes approved.

"The exchange area of an exchange shall include all subscribers receiving telephone service from said exchange, whether over company-owned or service station facilities.

"The filing of a map designating the area of service rendered a service station company does not ipso facto create responsibility to serve such area, in event the service station company shall cease to exist.

"The acceptance or approval of a telephone service map filed pursuant to this general order shall in no way preclude the commission from thereafter entering into an investigation, either formally or informally, for the purpose of determining the accuracy of the map, or of assisting in settlement of any boundary dispute."

The order requires that uniform legend requirements be followed. Maps will be drawn to a scale of ⅝ inch per mile with exchange boundaries shown in heavy black lines. Service station areas will be shown by dash-dot lines and shaded areas will designate overlapping of service from an adjoining exchange.

Service Removal Request Dismissed in N. J. Case

The New Jersey Public Utilities Commission on Apr. 7 dismissed the application of the New Jersey Bell Telephone Co. to remove telephone service from Mrs. Jeanette Hausler of Springfield, and from Mrs. Mary Zelinski of Millburn. The two women were accused of refusing to give up a party line when Dr. Marvin Becker wanted to

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make an emergency call last November (TELEPHONY, Jan. 30). Mrs. Zelinski is appealing a $200 fine.

The telephone company's petition was turned down, the commission said, because the party line subscriber in the case, Peter Zelinski of Millburn, has since had private line service installed, which was applied for before the November, 1959, incident.

The commission has also directed New Jersey Bell to send notice to all party line users that they are required to relinquish their telephones to permit emergency calls.

N. Y. Company Gets Rate Raise; Expands Base Area

The New York Public Service Commission has granted the Highland Telephone Co., Monroe, an $85,900 rate increase effective Apr. 21 (TELEPHONY, Apr. 2).

The company stated that its operating expenses for the next 12 months will exceed those for 1958 by $151,700 and those for 1959 by $92,100.

Included in the approved tariff amendment, is a provision for the extension of base rate service. Mileage charges for 262 subscribers who will now be in the base rate area will be discontinued. These charges will be reduced for 402 other subscribers who now will be closer to the base rate limits. This means that rates for the total of 664 subscribers affected by the extension will be reduced by $9,000.

The company operates six dial exchanges in Monroe, Goshen, Highland Mills, Washingtonville, Maybrook and Chester.

C&P of Md. Asks $13,500,000 Raise; Current Value Base

The Chesapeake & Potomac Telephone Co. of Maryland on Mar. 30 filed a request with the Maryland Public Service Commission asking for a rate increase of 13.5 million dollars.

W. Griffin Morrel, company vice president, said a minimum increase of 6.3 million dollars in net income is necessary if the desired level of service is to be achieved.

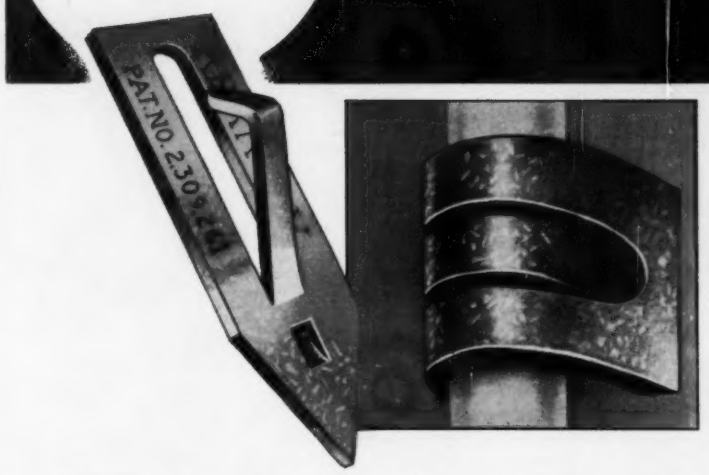
The rate raise request is part of a proposal by the company that the commission completely overhaul its system of determining the value of the company's rate base. (See Francis X. Welch, "In the Nation's Capital," TELEPHONY, Apr. 9).

Clifford Davis, the company's general counsel, has presented a case showing the need for a current value, instead of an original cost less depreciation, rate base.

Currently, the company is entitled to

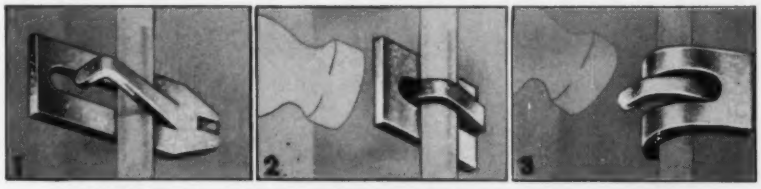
eliminates radio interference

KEARNEY NON-STATIC GROUND WIRE CLIP



When ordinary staples lose their hold in wood, contact pressure drops, and resultant air-gap static causes radio and television interference. KEARNEY Non-Static Ground Wire Clips prevent this interference by maintaining permanent, high pressure contact with ground wires, entirely independent of how tightly the clip is set in the pole.

When this clip is driven, a hook automatically, permanently grips the wire, remaining free of all trouble-causing air gaps. Inexpensive and easy to drive, this clip holds fast in all woods.



Easy to install: Just drive clip until point seats firmly in wood. Insert ground wire under hook, then drive until hook grips wire and starts protruding through slot in body. Bend end of clip over the wire and into the wood.

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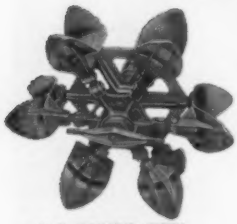

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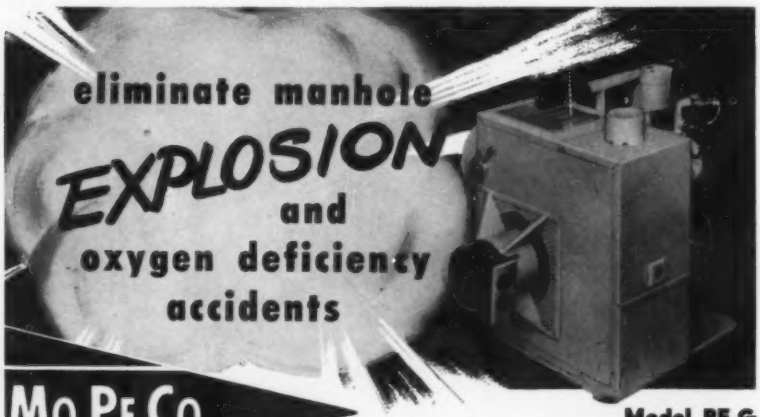

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earn 6.25 per cent on a rate basis computed at $289,700,000 at the end of 1959, according to the commission.

J. G. Franklin, C&P comptroller, stated that the rate base should be recognized as having a current value of $331,243,000, reflecting a 14 per cent increase over net original cost.

William F. Johnson, secretary-treasurer of C&P said that the company should have a 7.25 per cent return on the "fair value of its property."

The cost to the company for capital, he said, is now 7.2 per cent, and he cited these higher interest rates as one of the factors necessitating an increased rate of return.

Chesapeake & Potomac reported net operating income of $17,715,000 at the end of 1959, giving it a 6.12 per cent return on the commission-determined base. This amounted to a 5.35 per cent return on a current value rate base.

OK Mobile, Fixed Radio-Telephone Service in S. D.

The South Dakota Public Utilities Commission on Feb. 25 granted to the Dakota Cooperative Telephone Co., Irene, the right to install and operate an automatic dial radio-telephone installation, to be integrated with its present telephone system, and to offer its subscribers mobile and fixed mobile telephone service, in accordance with its general tariff adopted and approved by the commission.

This Mobiltel system will interconnect all of the company's central offices, and thus, all of the subscribers of the Dakota Cooperative. Mobile subscribers can place calls to any land subscriber served by the company. This will all be accomplished on a non-toll basis. By dialing "operator," the mobile subscriber will have full toll privileges.

It is anticipated that subscribers of neighboring telephone companies will subscribe to the service, as will subscribers from Sioux Falls, S. D., which falls within the commercial coverage area of the system.

The Dakota company is an REA-financed telephone company, operating 12 dial telephone exchanges in southeastern South Dakota, serving 3,500 subscribers.

The president of the Dakota Cooperative company is B. Maynard Christensen, and the manager is Kenneth A. Knudsen. The company began operations on Sept. 1, 1953.

OK Sale of Two in Illinois

The Illinois Commerce Commission recently granted the Northern Illinois Telephone Co., Lanark, permission to purchase two companies (TELEPHONY, Feb. 27). These are the Farina Mutual

Telephone Co. and the A&G Telephone Co., Watson.

C&P of W. Va. Requests $5,539,000 Rate Increase

A petition seeking a $5,539,000 rate increase has been filed by the Chesapeake & Potomac Telephone Co. of West Virginia with the West Virginia Public Service Commission. The commission said the raise would give the company a net increase of $2,536,862.

The company also asked to remove so-called inter-zone message charges at some exchanges and extend areas for base rate service. In other instances, local calling areas would be extended.

W. M. Ellinghaus, company vice president, said "We have made this filing no earlier and in no larger amount than is necessary to enable us to properly discharge our public responsibility. . . . In view of . . . the likelihood of a continuation of inflationary trends, we are requesting that the commission recognize the need for improved rate of return."

The company seeks a 7.05 per cent rate of return, about 1 per cent more than its present rate.

Included in the filing was a proposal to discontinue toll charges in 23 West Virginia communities, which the company estimated would cost it $108,000 a year in revenues. This elimination would be due to increased regular charges covering expanded dial service.

Penalty Rates Effected, OK Loan, 2 Sales in Georgia

The Georgia Public Service Commission recently took the following actions:

Penalty rates were set for the Trion Telephone Co., effective until service difficulties have been eliminated.

Various complaints from subscribers had been filed with the commission charging the Trion company with poor service, the commission stated.

J. E. Kirk, president of the company, testified that since 1956, $32,427 had been advanced through personal funds for gross additions to plant. These included items of outside plant and central office equipment which, he said, provided additional facilities for improved service.

Mr. Kirk also stated that the company was in the process of adding 100 lines of central office equipment and associated equipment in order to provide service for waiting applicants and to upgrade service.

Kirk agreed that the central office equipment is overloaded and that there are insufficient trunk circuits between Trion and the Pennville and Summerville exchanges of Summerville Tele-

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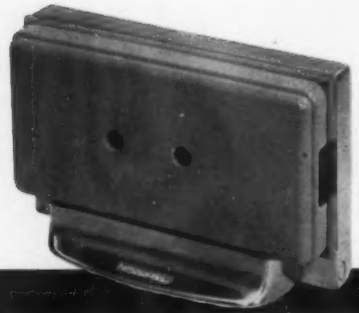

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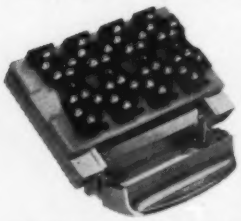

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phone Co. However, he said that plans had been made to provide 10 additional trunk circuits to Summerville which were to be installed by Apr. 1, 1960, thus making a total of 13 available. He estimated the cost of this project at $25,000.

In its order, the commission agreed that effort is being made to correct deficiencies. However, it said the current rates were in excess of the value of the service being rendered. It, therefore, ordered that business and residence main station rates should be reduced by 50 cents per month until the deficiencies have been eliminated.

•

The Glenwood Telephone Co. Inc. was authorized to borrow $14,000 from Stromberg-Carlson Co., a division of General Dynamics Corp.

This loan will be used to provide equipment to serve approximately 35 subscribers who have applied for service. Also, $1,050.28 will be used to retire demand notes issued to effect the purchase of certain equipment, with the balance to be expended as needed for the completion of the project.

•

Blue Ridge Telephone Co., a new corporation, was allowed to acquire the Blue Ridge Telephone Co. facilities which had been owned and operated as a partnership by Cecil G. Hartness and Hoke T. Jones.

•

Pinehurst Telephone Co. was authorized to sell to the Plant Telephone & Power Co., Inc., Tifton. The Pinehurst company was formerly owned by J. P. Gleaton. The Plant company planned to convert the exchange to dial operation.

Ask Permit to Sell in Neb.

The date of May 3 has been set by the Nebraska Railway Commission to hear the application of the Virginia Cooperative Telephone Co. to sell to the Diller Telephone Co., and for establishing a schedule of rates.

Hear Rate Request in Wis.

The application of the Almond Telephone Co. for authority to increase its rates was to have been heard by the Wisconsin Public Service Commission on Apr. 18.

Ask Incorporation OK in Ark.

The Mountain View Telephone Co. on Apr. 5 asked the Arkansas Public Service Commission for permission to incorporate and to issue 774 shares of $50 par value stock.

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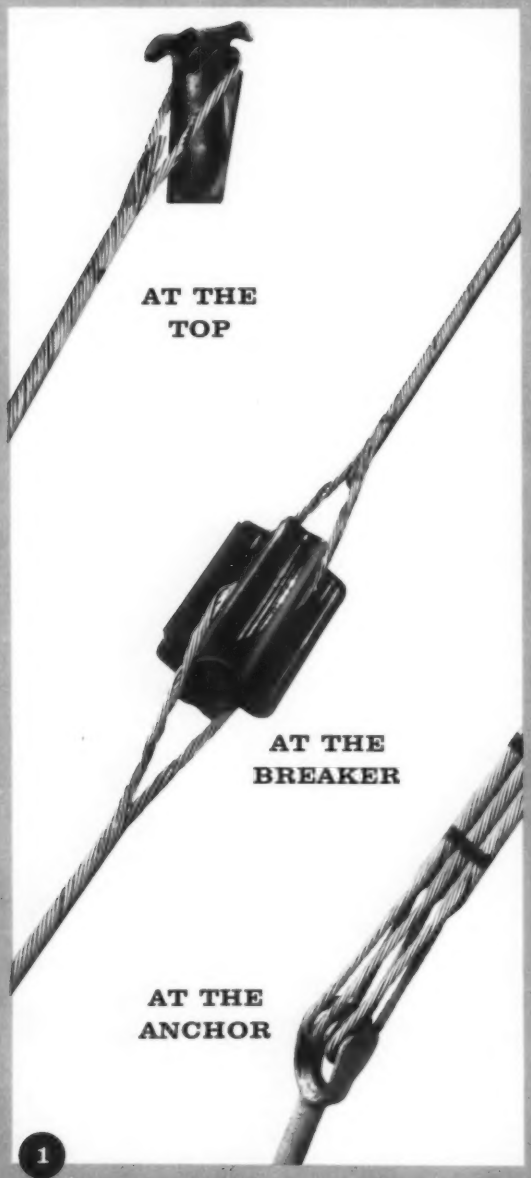

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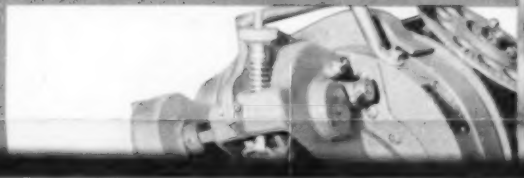

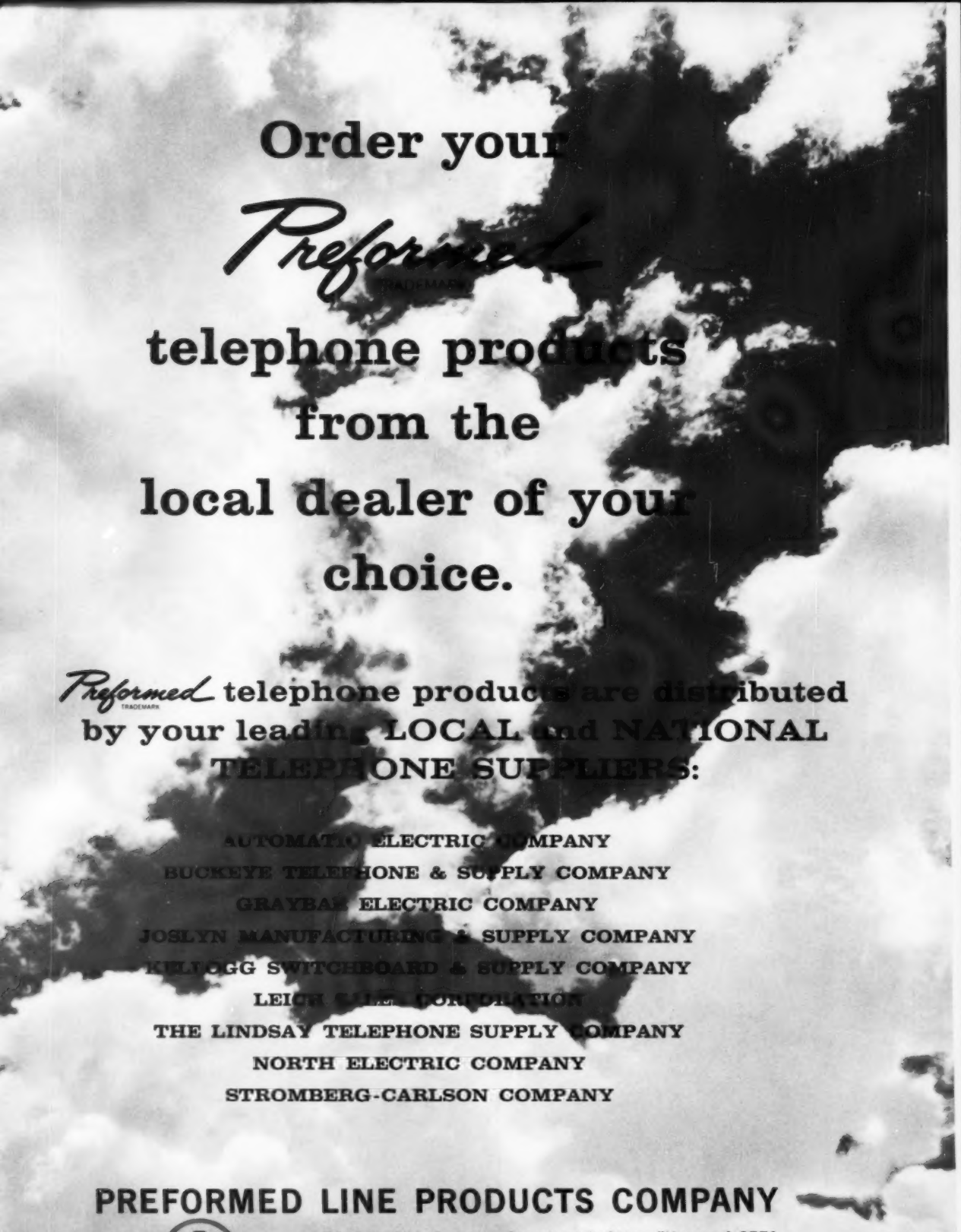

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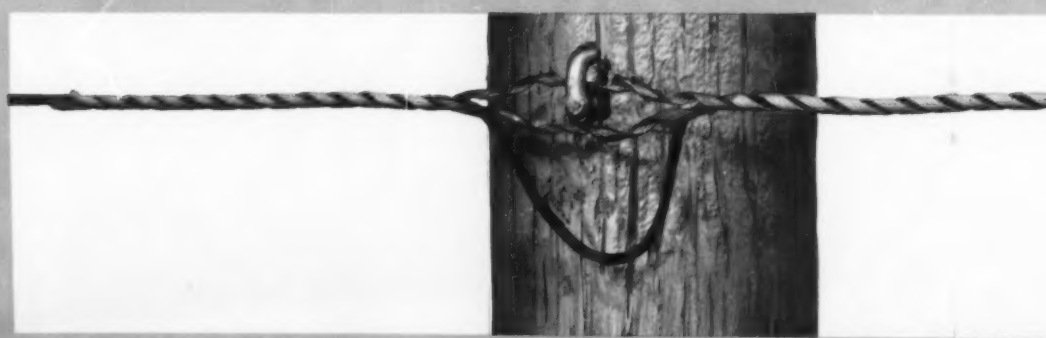

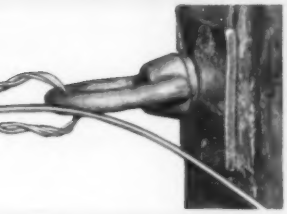

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er-Covered Steel.

6 *Preformed* SPLICES

repair abraded or severed line wire at tie points and mid-span, restoring full strength and conductivity. No tools needed—no wire cutting. Provide armor protection at tie points. Made in materials compatible with Galvanized Steel and Copper-Covered Steel line wire.

med

PINCH
S (PPB)

radled
4"
efore
tion.
high-
olyvinyl

9 *Preformed*

PLASTIC
VIBRATION
DAMPERS (PVD)

reduce fatigue damage from vibrating open line wires. Non-traveling; one size fits all open line wires.

10 *Preformed*

SPLINT & TIE
ASSEMBLIES

minimize wear and prolong the life of line wire. Made of Galvanized Steel and Copper-Covered Steel.

Preformed

CROSSARM
TANGENT SUPPORTS

cradle C-Rural wire to protect against contact with crossarms. For use where climbing clearance is required, or to provide ground clearance.

12

13 *Preformed* DEAD-ENDS

. . . the sure, least expensive way to dead-end one-pair aerial distribution wire. Used in conjunction with Preformed C-Rural Tangent Supports, they provide a unique method of suspension. Made of Stainless Steel, Neoprene-Coated. Firm, cushioned grip distributes pressure uniformly.

Rural Distribution Wire (B-Rural)

Preformed

14

GRITTED ARMOR RODS (ADAPTERS)

increase the diameter of the messenger and protect it from abrasion caused by attachment of D span clamps or wire splice terminals.

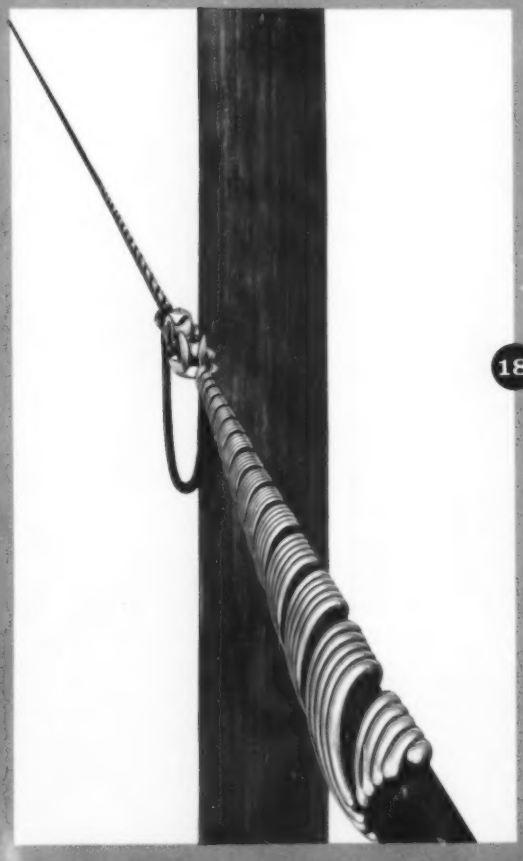
Preformed

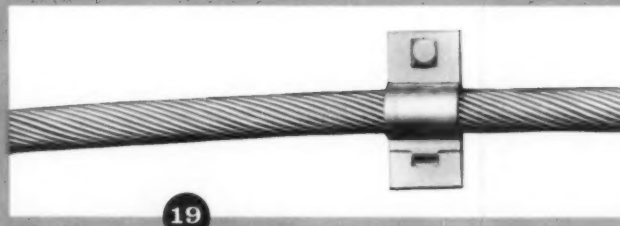
16

ALUMINUM ALLOY ARMOR RODS

with One-Bolt Clamp eliminate expensive J-Hook installations. Protect insulated messenger from clamping stresses; increase holding power. Applied over insulated line wire.

Plastic-Covered Self-Supporting Telephone Cable





19

Preformed **ALUMINUM ALLOY LINE G**

SUPPORT CLAMPS . . . used in combination
to suspend jacketed cable.

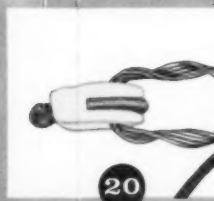
18

Preformed

PLASTIC-GRIP DEAD-ENDS

the only way to secure covered conductor safely and permanently.

Drop Wire

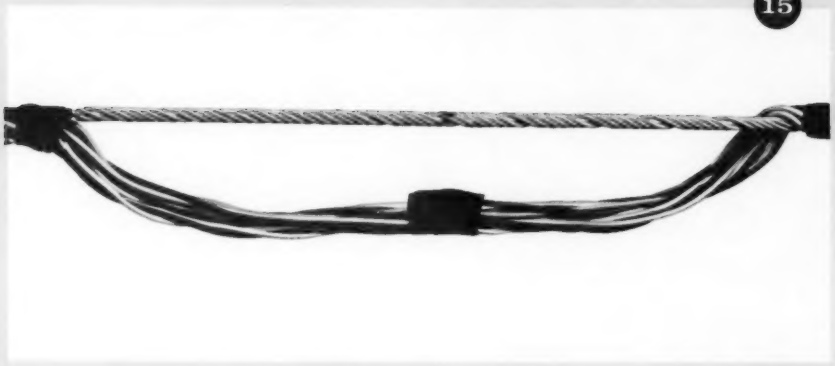


20

Preformed **DRO**

eliminate bail failures a
reuse. Made of Stainles

15

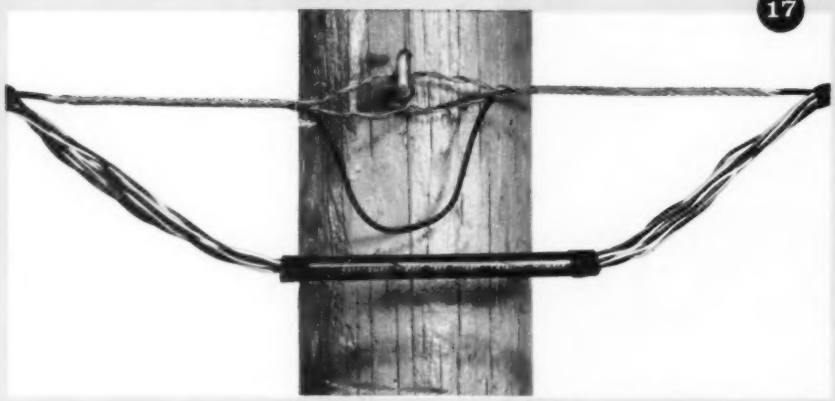


Preformed

SPLICES

. . . the fast, economical way to join stripped messenger of B-Rural wire. Applied by hand. Hold full-rated strength of the messenger.

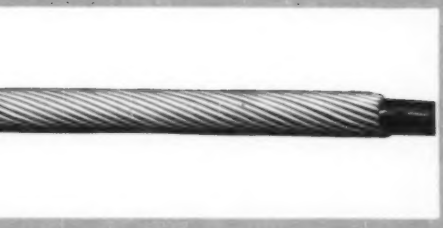
17



Preformed

DEAD-ENDS

permit economical dead-ending of stripped messenger without cutting the messenger wire. They eliminate stress points which cause premature fatigue failure; hold full rated strength; easy hand application; can be reused.



NE GUARDS and GALVANIZED STEEL TANGENT

ation with Preformed PLASTIC-GRIP DEAD-ENDS

DROP WIRE DEAD-ENDS

ures and prevent stripping of the insulation. Easily removed for

ainless Steel, Neoprene-Coated.

Check here for more information

Please send full particulars on the following checked (✓) items:

1		5		9		13		17	
2		6		10		14		18	
3		7		11		15		19	
4		8		12		16		20	

NAME_____

TITLE_____

COMPANY_____

_____

ADDRESS_____

_____

CITY_____ ZONE____ STATE_____

AND MAIL TO:

PREFORMED LINE PRODUCTS COMPANY

5345 St. Clair Ave., Cleveland 3, Ohio

THE POTENTIAL MARKET

Continued from page 32

District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia and Florida.

The sixth installment appeared in the Apr. 9 issue, covering REGION VI. East South Central — Kentucky, Tennessee, Alabama and Mississippi.

REGION VIII. Mountain — Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada.

(See also "Impact of Telephone Communications on Economies of the Various Geographic Regions of the U. S." —TELEPHONY, Aug. 29, 1959.)

Montana

There were 8,000 service units without payrolls and 6,400 with payrolls. The total of 14,400 represented 10.9 per cent of all the service units in the region.

The various potential markets for telephone answering devices are as follows: Primary market, 7,200; secondary market, 1,500; tertiary market, 1,800. The total of 10,500 represents 4.7 per cent of total telephones.

Idaho

There were 6,000 service units without payrolls and 6,000 with payrolls. The total of 12,000 represented 9 per cent of all service units in the region.

The various market potentials for answering instruments are as follows: Primary market, 5,400; secondary market, 1,400; tertiary market, 1,700. The total of 8,500 accounts for 4.2 per cent of total telephones.

Wyoming

There were 4,800 service units without payrolls and 4,400 with payrolls. The total of 9,200 accounted for 6.9 per cent of all the service units in the region.

The various market potentials for answering devices are as follows: Primary market, 4,300; secondary market, 1,100; tertiary market, 1,200. The total of 6,600 is 5.8 per cent of total telephones.

Colorado

There were 17,600 service units without payrolls and 18,400 with payrolls. The 36,000 service units accounted for 27.2 per cent of the regional total.

The metropolitan areas in *Table 2* absorbed 48.8 per cent of all the service units in the state.

The various potential markets for answering instruments are as follows: Primary market, 15,800; secondary

KOHLER ELECTRIC PLANTS

RELIABLE INDEPENDENT POWER

Emergency··· to meet OCDM regulation

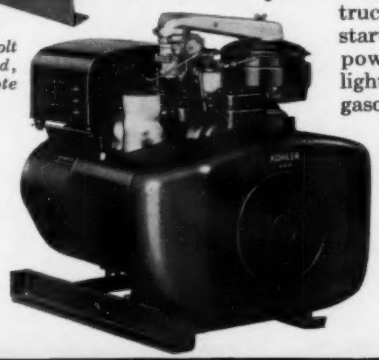
Portable··· for repair trucks

Kohler stand-by electric plants, installed as specified by the OCDM directive, will qualify many of your customers to buy radio equipment with matching Federal funds. The order calls for emergency power at base and control positions, and repeater stations.

Requirements are met fully, reliably, by Kohler stand-by plants with automatic transfer switch—completely packaged for immediate, unattended takeover of emergency loads.

Use portable, direct service Kohler electric plants on maintenance and repair trucks—compact, quick-starting, high capacity for power tools and floodlights... Sizes to 100 KW, gasoline and diesel. Write for folder J-15.

MODEL 2.5R21, *2500 watts, 115 volt A.C. Air-cooled, gasoline. Remote start.*



MODEL 5RM21, *5 KW, 115 volt A.C. Air-cooled, gasoline. Remote start.*

KOHLER CO. Established 1873 KOHLER, WIS.

KOHLER OF KOHLER

Enameled Iron and Vitreous China Plumbing Fixtures • All-brass Fittings
Electric Plants • Air-cooled Engines • Precision Controls

LINE CLEARING
PRUNERS

FAST
CUTTING
DEPENDABLE
HEAVY DUTY

Designed and manufactured with utility line clearing in mind. Rugged, heavy duty tools that are famous for their fast, easy cutting action.

POLE PRUNERS

No. 11
A strong, durable, easy cutting pruner head that cuts up to 1" branches with ease. Open stock spruce extension poles in 6 foot sections, with telescoping aluminum joints.

No. 12
Cuts up to 1½" branches. Pruner head is malleable iron casting, husky, unbreakable. Smooth, easy cutting action.

LOPPING SHEARS
Heavy duty, fast, easy cutting loppers designed for utility use.

No. 75
Compound lever cutting action, smoothly slices through 1¾" to 2" branches.

Nos. 525, 530
The famous "Tiffany" pattern lopping shears 25" and 30" models. Cut branches up to 1¾".

PRUNING SAWS

No. 1826
26" blade of Sandvik Swedish steel especially designed for tree work. For those spots where a chain saw can't operate.

Send for literature and additional information on pruning tools of all types.

SEYMOUR SMITH & SON, INC.
Quality Tools
SEYMOUR SMITH
Since 1850
Oakville, Connecticut, U. S. A.

Sales Representative
JOHN H. GRAHAM & CO. INC.
105 Duane Street, New York 8, New York

market, 4,200; tertiary market, 5,200. The total of 25,200 represents 3.8 per cent of total telephones.

New Mexico

There were 8,400 service units without payrolls and 8,400 with payrolls. The total of 16,800 represented 12.7 per cent of the regional total.

The metropolitan area shown in *Table 2* accounts for 26.1 per cent of service units in the state.

The various potential markets for answering instruments are as follows: Primary market, 7,600; secondary market, 2,000; tertiary market, 2,400. The total of 12,000 is 5.2 per cent of total telephones in the state.

Arizona

There were 12,000 service units without payrolls and 10,400 with payrolls. The total of 22,400 accounted for 16.9 per cent of all the service units in the region.

The metropolitan areas shown in *Table 2* absorbed 53.5 per cent of all the service units in the state.

The various market potentials for answering instruments are as follows: Primary market, 10,800; secondary market, 2,900; tertiary market, 2,700. The total of 16,400 accounts for 5.1 per cent of total telephones.

Utah

There were 7,200 service units without payrolls and 6,400 with payrolls. The total of 13,600 accounted for 10.3 per cent of the regional service units.

The metropolitan areas in *Table 2* absorbed 61.7 per cent of all the service units in the state.

Various potential markets for answering instruments are as follows: Primary market, 6,500; secondary market, 1,800; tertiary market, 1,700. The total of 10,000 represents 3.2 per cent of total telephones.

Nevada

There were 3,600 service units without payrolls and 4,000 with payrolls. The total of 7,600 was 5.6 per cent of the regional total.

The various potential markets for answering instruments are as follows: Primary market, 3,200; secondary market, 900; tertiary market, 1,200. The total of 5,300 represents 5.6 per cent of total telephones.

Magic of Books

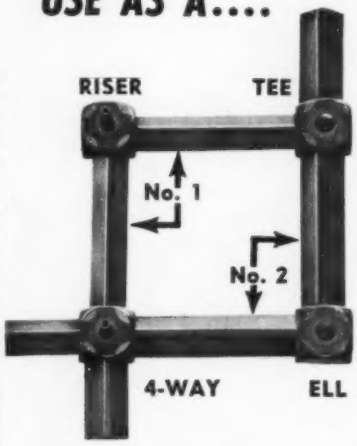
"Except a living man, there is nothing more wonderful than a book! a message to us from . . . human souls we never saw. . . . And yet these arouse us, terrify us, teach us, comfort us, open their hearts to us as brothers."—KINGSLEY.

FLEXIDUCT

Part No. 345 *Patent Pending

NEW, universal fitting* used with the two sizes of Flexiduct solves all over-the-floor wiring problems.

USE AS A....



- Under Floor Input
- Terminal Box
- Junction Box
- Or In Combinations of All

Fits any over-the-floor wire molding. This new fitting used with Flexiducts two sizes is the popular, easy solution on all jobs.

Flexiduct No. 1
will carry up to 8 conductors of inside wire. Chase ¼" x ½"

Flexiduct No. 2
will carry up to 25 pair cloth cable or 16 pair plastic. Chase ½" x ¾"

Always Keep Flexiduct on hand

Available through:
Western Electric Co., Inc.
Graybar Electric Co., Inc.
Leich Sales Corp.
Stromberg-Carlson
Kellogg Switchboard & Equipment Co.
Buckeye Telephone & Supply Co.

WINDERS & GEIST, INC.
2219 North Cotner Blvd.
Lincoln 5, Nebraska

TROUBLE CLEARING

Continued from page 38

bridge measurement, from the central office to each terminal is also very valuable information in case of trouble.

A third type of record that will save many man-hours on installation work is the assignment record. With this record, the terminal out of which a new telephone should work can be definitely determined from the central office. The pair can then be tested and the MDF jumper run. If cuts are involved, these can also be laid out. The installer can then install the telephone, connect the drop to the designated pair, and it is ready for service.

Assignment Record Helps

The best form for such a record is a card file. Suppose that a telephone is to be installed at 1323 Main St. The assignment clerk looks in the file for the group of cards which covers all odd house numbers on Main St. He finds a card marked "1317 to 1325." The desired number is in this range. This card shows that the terminal for this house number is located at the rear of 1320 Brown St. and that the cable is No. 5.

This means that the terminal is in the alley between Main and Brown and is on the Brown St. side of the alley. Such a terminal would also serve some of the even numbers on Brown and perhaps some numbers on a cross street. The terminal is found in the cable record and the assignment is quickly completed.

This record is somewhat expensive to prepare, as it involves a careful field survey of the entire exchange. Once prepared, it is not changed until some part of the cable plant is rearranged. Possibly this record would not be justified in a very small exchange which has only a few terminals.

On a rural lead, a pin record which shows the line number on each pair of pins at each pole will often save many hours of work when installing a new line.

Keep Perpetual Inventory

In any rate case, the value of the plant in service is an important factor. This can be obtained by a physical inventory of the plant, but such inventories often require several months of work. A perpetual inventory of plant in service will enable the company to know at all times where it stands in this matter. A well kept record of this kind will sometimes be accepted by the commission in lieu of a new physical inventory.

The record of instruments, inside

Crapo HTL-195

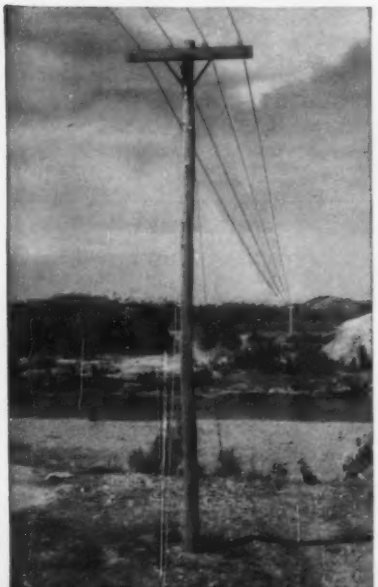
EXTRA HIGH-TENSILE TELEPHONE LINE WIRE

for low-cost Rural Lines

• Spans up to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading districts are possible where Crapo HTL-195 is employed. This extra long span construction results in marked savings in costs per mile of line. Pole structures can be reduced to a minimum. Fewer pole structures mean substantial savings both in materials and man-hours of labor. There is less hauling to be done, fewer holes to dig, less material to be handled, installed and connected.

Improved electrical qualities make practical typical subscriber loops of 14 to 15 miles with normal voltages and equipment. Also can be used for subscriber carrier.

Write for Engineering Manual No. TM-59



INDIANA

STEEL & WIRE CO., INC.
MUNCIE, INDIANA

wire, protectors, and of drops is posted from the service orders. Other items of outside plant are posted from work orders of various types. Even the smallest company should not add or remove plant without a written work order of some kind.

Numerous records are required in the central office. Dial offices require more records than the more simple manual offices. Battery records are of special importance. They prolong the life of the battery by foretelling impending trouble.

The last record that we will discuss at this time is the Trouble Record. Why keep a Trouble Record? Why not just clear the trouble that is reported, then forget about it?

An angry subscriber demands a rebate, claiming that his telephone has been out of service for days or weeks. The telephone man says to himself: "If only I had a record of this man's trouble!"

With such a record, he could stand his ground if the complaint was unjust, or quickly make an adjustment if the man's claim was correct.

A group of subscribers makes a complaint to the commission, alleging too frequent trouble and too much delay in clearing it. Now this group has undoubtedly made some written notes about their trouble before going to the commission. Does the telephone company have a written record to refute it? If not, they are in a bad position. This could result in the loss of a rate case.

Records Help Position

On the other hand, if the company can show the commission a well kept trouble record, which shows the amount of trouble each month by classes of

Answers to Questions On Page 58

(1) Yes.

(2) Each credit card is issued on a yearly basis and contains a number which is recorded by the operator for billing purposes.

(3) A credit card number consists of 9 to 11 characters, plus the suffix, if any.

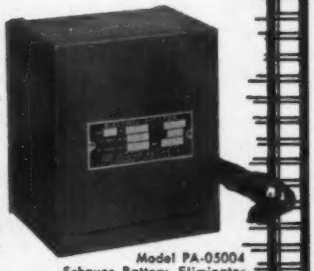
(4) No, unless the customer requests the operator to do so.

(5) The operator will cross out "col" in the "Collect" space, enter the credit card number, draw a line through the calling number, and proceed in the regular way for a credit card call.

BE SU-RRR-E!

Make SCHAUER your source for dependable DC POWER!

SCHAUER is recognized by the Telephone Industry throughout the world as a leading manufacturer of battery eliminators and battery chargers for almost every DC power requirement. You save with Schauer—on low first cost, low operating cost, and reliable service. See your Jobber or write for Bulletin No. 1470.



Model PA-05004
Schauer Battery Eliminator

Here's a sure SCHAUER power source for the operator's circuit on magneto switchboards

Schauer Type PA-05004 Battery Eliminator delivers constant, hum-free direct current to the operator's circuit. Equipped with relay for automatically transferring power to stand-by dry cells in the event of AC failure. Standard capacity is 4 volts DC at 0.5 amps. Steel case, for wall mounting is 5½"x6¼"x4".

Rectifier Division
SCHAUER
MANUFACTURING CORP.
4514 Alpine Ave., Cincinnati 42, O.

plant; the number of cases carried over to the next day, or longer; and if the company can show they have set up trouble-clearing objectives and are working towards attaining these objectives, it is in a much better position.

Present trouble results may not be satisfactory, but the company is getting "on top of it." They are working hard and they know what they are doing. The commission will go along with them and give them a reasonable time to correct this condition.

A small company does not require the complicated trouble records used by a company which operates a large exchange or a large group of small exchanges. However, there are certain minimum requirements. The most important is a written record of each case of trouble, showing: date and time reported; nature of the report; date and time cleared; and what was found.

In the foregoing discussion we have touched upon several of the most important plant records. We hope to be able to discuss each of these in more detail in some future articles. We will also have more to say about our special hobby, the trouble records and trouble program.

Remember Golden Rule

"Since one of the so-called 'fringe benefits' which people enjoy is the confidence and knowledge that the place of their employment is highly regarded by the public, every individual has a share in the responsibility for making sure that the institution is worthy of pride. No one person can do this job. No amount of money spent in 'public relations' programs can buy the results . . . produced by remembering and practicing the Golden Rule."—DR. DONALD J. CASELEY, University of Illinois Research & Educational Hospitals, Chicago, quoted in "White Collar Girl," column of *Chicago Tribune*.

Build lines to STAY with the CHANCE 8-WAY!
Give the Guy a CHANCE
This gives you a mole's eye view of what goes on below "see" level when a Chance 8-Way Anchor is dropped into a hole the same size as the base plate and expanded into solid earth all around the hole.
Mike the Mole UNDERGROUND OBSERVER

8-Way Expanding Anchors give you all 'round holding power

Only the Chance 8-Way Expanding Anchor, with its 8 rib-reinforced blades, expands into solid earth *all the way around* to form a pyramid-like square.

This design adds strength to expanding anchors. The pyramid enlarges the effective area of the anchor's holding power. Blades that expand side by side leave no wasted space between them—can be shorter, less apt to bend, and expand in a wide area of solid earth all around the hole.

Make the Chance 8-way *your* standard for the kind of guying you can install and forget. Available from your anchor distributor, in sizes from 60 to 200 sq. in. in area.

. . . and there are CHANCE ANCHORS for all other soil and guying conditions

A·B·CHANCE CO· CENTRALIA MISSOURI

(A·B·CHANCE CO. of Canada, Ltd., Toronto) CA58-3

News on New Products

ANTI-SLUG PROTECTION DEVICE FOR PAYSTATIONS—Automatic Electric Co., Northlake, Ill., has added a new anti-slug protection feature to all postpay and semi-postpay paystations manufactured by the company.

This device, described as "swindle-proof," consists of a small Alnico magnet located in the paystation's chute channel. If a magnetic-type slug is dropped into the chute, the anti-slug ejector pulls it away from the 25-cent gong so that no signal to the operator can be made. Following ejection, the slug is dropped into the coin hopper.

If a customer insists that he has deposited sufficient coins, says the company, the operator may return the coins he has deposited. She then asks for a redeposit—which, it is believed, should discourage the reuse of a slug.

The operator will also be able to hear noise from the coins or slugs as they pass down the chute, but if a coin signal does not follow, she will know that a slug has been deposited.

In addition to the anti-slug device, AE makes an Anti-Slug Conversion Kit for paystations now in service. This kit, the company explains, is limited to paystations manufactured later than 1950. Request NP1308.

•

ELECTRO LEAD POT AND FURNACE—The Maurice Fetterman Co. has announced an Electro Lead Pot and Furnace for melting lead, solder, babbitt, etc.

The Electro Lead Pot and Furnace is

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1308_____; NP1309_____; NP1310_____; NP1311_____;
NP1312_____; NP1313_____; NP1314_____; NP1315_____;
NP1316_____; NP1317_____; NP1318_____; NP1319_____;
NP1320_____; NP1321_____; NP1322_____.

Name.....

Company.....

Street.....

Town and State.....

4/23/60

GET ON THE ALTEC LINE—for improved telephone equipment

The best number in your book—the one that connects you with the Altec line. For performance, reliability, and servicing ease, the Altec line of amplifiers and equipment have won a resounding vote of confidence from the industry. Precision-engineered to meet your most exacting specifications, Altec products offer the improved design that makes maximum use of minimum space—and the "plus" that makes the difference—Altec quality.

The 455A Amplifier is a transistorized repeater type amplifier wrapping up a compact package of gain for telephone circuit use. Incorporates the gain, power handling capacity, frequency response, plug-in features in the physical size of vacuum tube type repeater. Ten repeaters go in the same standard rack mount used for vacuum tube types. Operates on 48 volt DC @ 22 ma. Since it is transistorized no 130 volt supply is needed. For details, write for Altec Lansing Bulletin #13385.

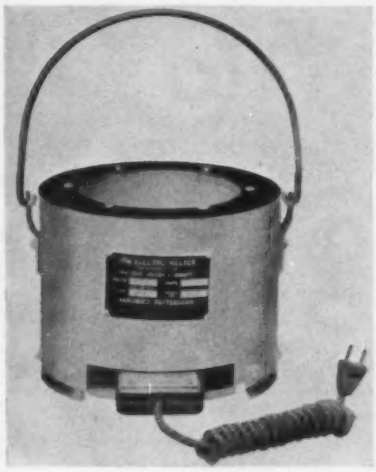
The 529A Power Supply, designed for standard rack mounting, occupies only 3½" of panel space. Operates from 117 volt, 50/60 cycle AC line and delivers 20 volts DC at 3 amps., (0.3 amp at each of ten separate outlets). Maximum ripple content is below 0.002 volts at operating voltage, insuring extremely low noise and high efficiency amplifier operation. Each power outlet is individually fused with a 3/10 amp. fuse. DC voltmeter and rotary selector switch to check each distribution outlet are incorporated on front panel. Variable resistor located on panel front permits adjustment of output voltage to suit load conditions. The 529A can be used with Altec Transistorized Repeaters 477A, 449A, 450A and 453A. Write for Bulletin #13224.

For complete information about Altec telephone and paging equipment write to the address below or call Prospect 4-2900 in Anaheim or ALgonquin 5-3636 in New York.

ALTEC LANSING CORPORATION

ALTEC LANSING CORPORATION, DEPT. T-4D
1515 S. Manchester Ave., Anaheim, Calif.
161 6th Ave., New York 13, N. Y.
A subsidiary of Ling-Altec Electronics, Inc.

a one-piece unit which is fully insulated. It is made in three sizes, which have 25, 45, and 75-pound capacities, with a temperature range of from 600° to 1000°—from low to high heat. It uses little current and does not affect other appliances or lights when in use.



The company cites as advantages of these units:

There is no fuel to carry.

There are no flame, no smoke, no fumes, no noise.

The electro lead pot and furnace never runs out of fuel in the middle of a job.

It can be plugged into any convenient outlet.

Request NP1309.

•

NEW AERIAL LADDER—The Holan Corp., Cleveland, Ohio, announces that the Series 2600-A manual-hydraulic ladder will replace the Series 2600 in the company's line of aerial ladders.

The pushbutton control and several other design features of the 2600, have been incorporated in the 2600-A, Holan states.

The support frame construction has

Announcing...

the NEW! IMPROVED BUS BROWN MODEL 468R 12 HP TRENCHER! (3" to 12" wide trench)

The digging chain and cutters have proved to be unequaled in performance and durability.

Drives on all 4 wheels while digging; rear wheels when in transport gear.

Boom can be raised to upright position.

Adjustable Auger leaves clean trench, depositing dirt on each side of trench for easier backfill.

Balancing on front wheels for easy steering while moving forward.

PATENTED

DESIGNED FOR MAXIMUM EFFICIENCY AT MINIMUM COST!

MAXIMUM EFFICIENCY

The Model 468R 12 HP Trencher is small, compact, rugged and easy to manoeuver. It is designed to give you maximum efficiency due to faster digging speed.

MINIMUM COST

Only one operator is needed . . . digging speeds are greater . . . and the simplicity and compactness of design lowers maintenance cost, making your trenching less expensive.

Write today for complete information!

BROWN MANUFACTURING CO., INC.
WOODBINE, IOWA

TAKE A BIG STEP TOWARD SAFETY WITH DUO-SAFETY LADDERS

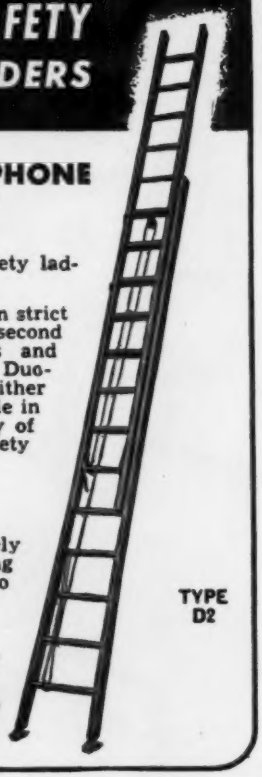
... CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

Trenching Costs Only Pennies Per Foot with the ARPS TRENCH-DEVIL

Costs Less to Buy! — Costs Less to Operate! — Costs Less to Maintain!

LOOK . . .

★ **Speeds** up to 1200′ per hour; depths — 1½′ through 4½′; widths — 2¾″ through 8″.

★ **Power Boom Control** permits fast raising and lowering of boom for rapid trenching; depths are accurately controlled, eliminating guesswork.

★ **Reversible Dirt Conveyor** is standard equipment — deposits dirt at selected distance from either side of trench. In only 60 seconds, conveyor may be switched from one side to the other.

★ **Easy Transporting** — under its own power, the self-propelled Model MA-2 may be run up skids, into a pickup truck, or driven at 2¾ M.P.H. One man loads — transports — unloads — trenches.

★ **Smaller Model JR** Trench-Devil digs 2¾″ or 3½″ wide, up to 20″ deep. Simple, one-man operation and fast — speeds of 15 feet per minute at a 12″ depth.

Write today for full details on both models. Dept. T.

ARPS CORPORATION
NEW HOLSTEIN, WIS.

TRENCHERS • HALF-TRACKS
BULLDOZERS • UTILITY BLADES

HAVING TROUBLE WITH OPENS?

Solve them quickly, with a Neale Troubleshooter's tone and the "Cable Trouble Shooting" booklet.

The Neale Troubleshooter's tone is an inexpensive, easy to use instrument, for talking and locating trouble in telephone cable.

The tone has circuits for high and low frequency testing, a circuit for talking, and a buzzer circuit for testing continuity.

It comes complete with batteries and four leads, all contained in a strong case

with an over-the-shoulder leather carrying strap. It weighs only 9 pounds with batteries.

JUST OFF THE PRESS: The Cable Trouble Shooting booklet has ten trouble shooting circuits, written and illustrated so the layman can understand them. We will be happy to send you a FREE copy of this booklet; just write to address below.

CABLE SPINNING EQUIPMENT CO.

3100 TOPEKA AVE.
TOPEKA, KANSAS

been changed from tubular to plate metal. Non-skid pierced metal pedestal step treads and re-location of the rotation crank to the left of the mast were other changes made by the company for added safety and ease of operation.

The dual-level platform, which is said to provide comfortable standing surfaces at all ladder angles, and 12,000-volt woodstrain insulators are standard on this Holan ladder.

The 2600-A aerial ladder is available in 28 and 32-foot heights; rotates 360° in either direction; and elevates to a 75° angle.

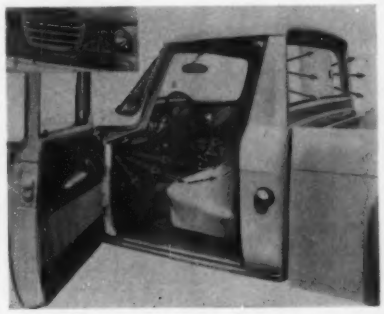
Fiberglas covering of the side rails and knurled steel ladder rungs are optional. Request NP1310.

■

TRUCK CAB VENTILATION— A new system of cab ventilation for Studebaker's Champ pickup truck is announced by F. T. Corcoran, Studebaker-Packard Corp. truck sales manager.

The Champ has a two-section sliding rear window, a feature which provides the new type truck cab ventilation, and is said to improve visibility.

Air is brought through the grille into the cab through two air vents on the right and left side of the cab's front



(see cut). The twin currents pass over the front seat and out the full-cab-width open rear window, providing a steady stream of fresh, cool air in the cab's interior, Studebaker points out.

Available in ½ and ¾-ton models, the Champ by Studebaker is offered in 5,000, 5,200 and 7,000 GVW (gross vehicle weight) ratings.

Request NP1311.

■

PORTABLE MANHOLE VENTILATOR-HEATER—An improved ventilating heater for manhole and other underground use is announced as in full production at the Morrison-Pelsue Co.

The 1960 MoPeCo Model PE-G is a 78-pound portable ventilator and heater which has such features as:

Attached 300-watt generator for electric light or soldering iron.

A new waterproof weatherguard to

Used By: ELECTRICIANS • TELEPHONE COMPANIES • RADIO & TV SHOPS, ETC.

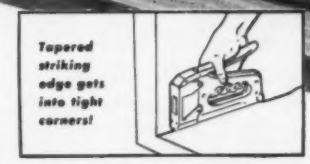
TAKES 3 STAPLE SIZES:
3/8" 7/16" 9/16"
AVAILABLE IN:
Brown, Ivory, Beige, Monel, Bronze, Natural

ARROW T 25

LOW VOLTAGE WIRE TACKER

FOR FASTER, SAFER, MORE SECURE FASTENING OF ANY LOW VOLTAGE WIRE UP TO ¼" IN DIAMETER, INCLUDING:
BELL WIRE • THERMOSTAT WIRE • INTERCOM WIRE • TELEPHONE WIRE • RADIANT HEATING • JACKETED WIRE (JKT) • ELECTRICAL WIRING • CO-AX CABLE.

CANNOT JAM!
(PATENTED NON-CLOGGING MECHANISM)



WRITE FOR CATALOG

ARROW T-75 SHEATH CABLE TACKER
FOR ANY INSIDE OR OUTSIDE CABLE UP TO ½" IN DIAMETER
- Fastens ROMEX up to 12-3
- Fastens inside wire up to 26 pair

TAKES 3 STAPLE SIZES:
9/16" 5/8" 7/8"

ARROW FASTENER COMPANY, INC. ONE JUNIUS STREET • BROOKLYN 12, N. Y.

THE DIERKS TREATING PLANT—*the Nation's Largest...*

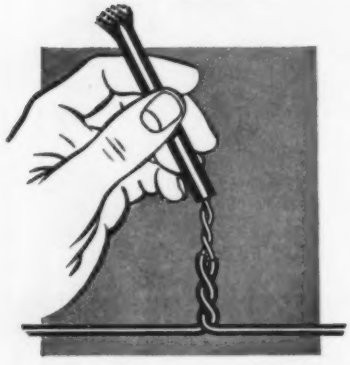
offers a dependable source of supply for UTILITY POLES, PILING, TIMBERS, POSTS and LUMBER produced from timber grown in Dierks' own forests, expertly pressure-treated with Creosote or Penta.

For Top Quality and Fast Service, send your inquiries to . . .

Write for a free copy of "Dierks Pressure-Treated Southern Pine Poles Specifications and Information."

WOOD PRESERVING DIVISION
Dierks Forests, Inc.
810 Whittington Ave Hot Springs, Ark

Superior's "Super-Splice"® is safe and sure!



"Super-Splice" makes splices waterproof . . . from inside out!

Sealed at one end, this plastic splice sleeve is filled with an insulating and waterproofing compound.*

Economical "Super-Splice," a Superior exclusive, makes the splice permanently as good as the cable . . . yet it can be re-entered easily. The compound never hardens or oozes out no matter what the temperature.

Prevent leakage currents and breakdowns in the presence of moisture...good for 25,000 v.d.c. Order "Super-Splice" NOW!

*A Dow-Corning silicone compound.

An REA Standard.

"Super-Splice" is available for use with straight, butt or bridge splices.

For further information on economical "SUPER-SPLICE", write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION
Hickory, North Carolina

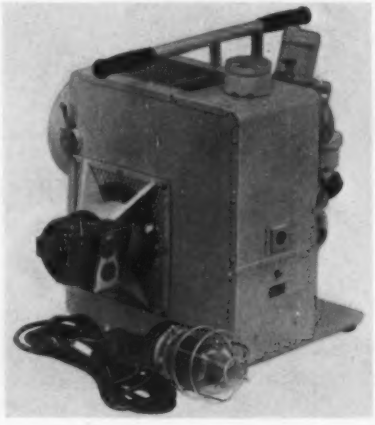
protect the electric outlets on the generator.

The case has rounded corners for added safety and general streamlining.

The stainless steel heat exchanger is fabricated with continuous welded seam.

The entire unit is said to have greater efficiency and an increased air volume.

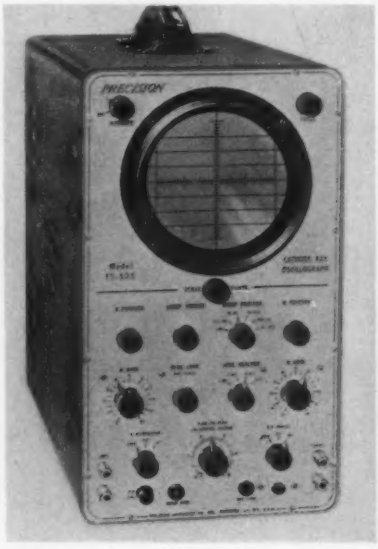
The MoPeCo Model PE-G is said to deliver from 300 to 800 cubic feet per minute of fresh heated air. The manufacturer stated this heated air passes through the heat exchanger and all products of combustion pass into the atmosphere through the burner exhaust, so that only fresh, heated air is forced into the manhole area.



The PE-G is designed for year-around ventilation, delivering heated fresh air for winter, and fresh air only, in summer when operated as a blower. Request NP1312.

•

GENERAL PURPOSE OSCILLOSCOPE—The Model ES-525 oscilloscope, a general purpose scope for communication and electronics education, industrial testing, laboratory applica-



Announcing the WB 400

"BREVI-BOOTH"

by ESSCO

TELEPHONE

NEW...DIFFERENT...

ECONOMICALLY PROVEN DENVER, COLO.

INCOME INCREASED by greater versatility.
MAINTENANCE DECREASED by exclusive Essco TAMPER-PROOF engineering.

In Denver's City Park, where *three* ordinary booths were destroyed in one season... *one* BREVI-BOOTH has lasted *two years.*

- STURDY
- VERSATILE
- TAMPER-PROOF

ESSCO PRODUCTS

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DENVER, COLO. • SP 7-6666

tions, and other uses, is announced by the Precision Apparatus Co., Inc.

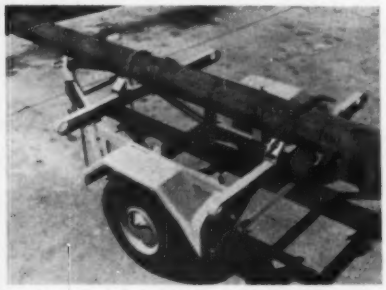
The new scope, according to the company, incorporates the latest circuitry and a maximum of flexible functions for general purposes. The Model ES-525 is a complete instrument for accurate visual circuit analysis, Precision states.

Dimensions: 8¼ inches x 14½ inches x 18½ inches.

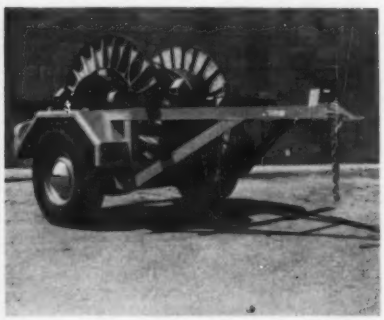
The unit comes complete with all tubes, including the CRT, and a comprehensive Technical Manual. Request NP1313.

•

POLE DOLLY—A new pole dolly, developed by Hogg & Davis, may also be adapted for carrying cable reels up to 50 inches in diameter; maximum reel width is 42 inches when not using a reel brake or 36 inches with reel brake. The dolly measures 44 inches between channels.



Hogg & Davis list the following as standard equipment: a 2-inch mandrel with centering cones; center pole binder; safety stand; self-locking bolster chocks; rear bolster hitch; specially designed loading tracks to guide accessories and reel to mandrel clamps.



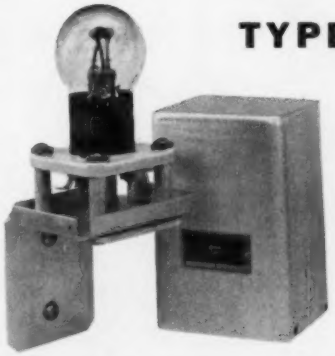
Other features are: removable rear bolster; box channel steel frame; heavy duty 6 ply truck tires; truck type wheels and spindles; 2½-inch draw bar hole; dual stop, tail and turn lights, and a 40-foot heavy duty hook-up wire for the lights.

The pole dollies may be hooked in series; for example, three, for a three-conductor stringing job, each of which

Gas filled tubes discharge high voltages much faster than conventional carbon blocks — ten times faster than air gaps — and discharge both sides of the pair at the same instant, preventing build-up and damage to equipment and insulation.

TYPE 167-B For Carrier Terminals

A panel-type unit which protects carrier terminals, their band pass filters, and other equipment from excessive voltage on the carrier line, the power line, or both. Consists of two plug-in type tubes, two 6-amp auto-reset circuit breakers, terminal strips, protected power outlet, and convenience outlet. If lightning or a power surge loads both power and telephone lines at the same instant, each tube discharges its respective line, with the circuit breakers also serving the power line. These circuit breakers also prevent follow-up arcs from normal current, eliminating expensive fuse replacement trips. Tubes are of 300-500 volt breakdown, will serve for years without maintenance. In that time, only a direct hit or near miss will be cause for replacement. For both remote and central office carrier terminals. The units mount on standard 19″ racks, are 3½ inches high.



TYPE 167X1
For Telephone Lines

Single-tube, single-pair protector of carrier line filters, impedance matching transformers, and similar equipment connected to open wire lines; also the drop side of subscriber carrier terminals. Uses plug-in type 300-500 volt tube. For easy bracket mounting, with snap-on weatherproof cover, fully insulated leads.

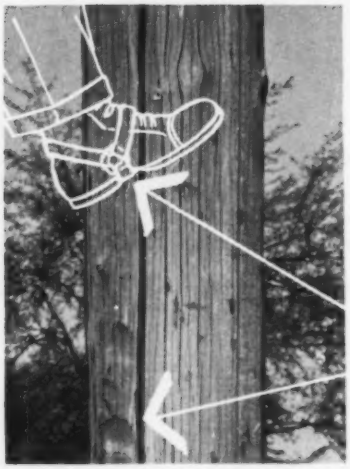
Write or call for information or Bulletin 259-C

BUCKEYE TELEPHONE & SUPPLY CO.

1250 Kinnear Road Columbus 21, Ohio

Telephone — HUdson 8-0655 (Area Code 614)

CHECKS
and
SPUR CUTS
are
Prime Decay Spots



and POLE SPRAYERS give them EXTRA ATTENTION

Older poles just naturally suffer from checks and spur cuts... trouble areas where moisture collects. This makes them vulnerable to the fungus decay condition known as "Shell Rot" which lessens pole life and impairs safety of linemen.

POLE SPRAYERS, INC.—Men, methods and materials—is a pioneer in the art of above-ground inspection and treatment for standing poles. Using proven preservatives, special attention and extra saturation is given to all critical areas. Fungus decay is stopped cold... reinfestation is prevented. Poles take on new life, last longer, costly replacements are delayed for years to come. Increased safety of your climbing personnel is assured.

You will be surprised to learn how little it costs to adopt an above-ground *Pole Spray* program. Get the facts. Write POLE SPRAYERS, INC., 976 Ellicott Street, Buffalo 9, N. Y.

Pole Sprayers Inc.

SERVING UTILITIES SINCE 1935

has a reel brake. Each dolly measures 9 feet in length. Request NP1314.

•

POLE PULLBAR—Hogg & Davis also offer a brochure covering their pole Pul-Bar. The Pul-Bar, they say, operates on a single-step jack principle which tightens two preformed wire ropes around a pole in a locking action.

Designed to pull dollies and dinkies with brakes, the Pul-Bar comes equipped with a chain to accommodate a lead chain or binder from a dolly. The Pul-Bar has a steel pole bumper and weighs 77 pounds. Request NP-1315.

•

PORTABLE POWER REEL—Another Hogg & Davis item recently announced is the Torq-A-Reel, a portable power reel and power capstan, a new accessory to the company's pole dolly.

The reel is built to do a great proportion of stringing, removing, or reconductoring in any system. The company says that when mounted on its pole dolly, the reel uses an H & D reel brake as its driving pully. It delivers rotary power to any reel up to and including a 50-inch diameter and a 36-inch width; is powered by 3 hp and 7 hp (depending on engine speed) gasoline engine; is adjustable through speed reducer and six V-belts, and has a ratio of engine speed to reel at a constant 150-to-1.

H & D say the Torq-A-Reel saves setup preparation time; eliminates need of tying up major stringing equipment, trucks, etc.; can be handled by one man, and is ready to go to work in 15 minutes. Request NP1316.

•

COUNTERBALANCE POLE WEIGHT—Hogg & Davis have also designed their Counterbalance Pole Weight to be used in setting or pulling poles which cannot be handled safely otherwise.

The company states this unit permits crossarms and necessary appurtenances to be installed on poles before they are set, making possible time and labor savings. Truck and digger booms can

MAKE A "TEST CUT" WITH BETTER HKP® PORTER PRUNERS

AND DISCOVER
FASTER, EASIER CLEANER *Pruning*

A FINER TOOL FOR EVERY PRUNING OR BRUSH-CUTTING JOB!

The proof of the pruner is *performance*! Try any Porter Pruner on any job. The first, fast, easy cut will convince you that the seconds saved per cut can mean $$$ saved from now on. If you are not using Porter Pruners, switch to these work-saving tools today! There's a Porter Pruner for all pruning jobs.

OVERHEAD AND ON-THE-GROUND CLEARANCE JOBS!

"FORESTER" HEAVY-DUTY BRUSH CUTTER — with exclusive patented "Slide Shift" — lets you switch from "easy" to "hard" to "toughest" cutting simply by shifting the handle. Takes the place of 3 ordinary pruners. 2 sharp, fine-steel blades give quick-healing, clean cuts, make work easy for operator. 2 models — 0290F — Capacity 1½" green wood; 0390F — Capacity 2" green wood.

PORTER POLE PRUNERS for utility line clearance. 4 models — for all work. Lightweight model — short and long arm types, with and without pulleys. Cut up to 1" green wood. Available with Solid or Jointed Poles.

ASK YOUR SUPPLIER — or write us for the complete PORTER PRUNER catalog.

HKP® H. K. PORTER, INC.
Somerville 43, Mass.

be used for setting the "long one" without fear of the pole butt getting away and causing casualty or damage. Request NP1317.

•

POLE TONGS—The Hogg & Davis company also announces larger pole tongs, for use in lifting telephone poles. Tongs which open to 23 inches have been added to two other sizes—openings of 11½ and 16¾ inches.

The company states the 23-inch pole tongs are made of high tensile steel (67,000 psi); weigh 100 pounds; have 1⅛-inch pins, full floating with welded heads, and three flame-hardened teeth on each side of tongs.

A trip line allows operator to load or unload tongs. Request NP1318.

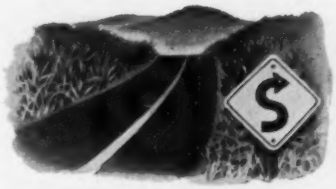
•

PROTECTIVE WIRE AND CABLE JACKET—A new method of protecting wires and cables that are subject to wear and abrasion by trees, or other objects, has been introduced by The Zippertubing Co.

Wear areas, according to the company, can now be protected by use of

Whatever your brush problem

Line?



Roadside?

Right-of-way?

WEEDONE can solve it!

With the right background—Chemical control of weeds and brush has developed along established lines of procedures and practices. Amchem initially pioneered the major advances in the field, has originated many of today's accepted procedures and products for efficient, economical weed and brush control. Your problems are in *experienced* hands when you hand them to Amchem!

With the right approach—Amchem's corps of weed and brush specialists are basically application specialists. Combining comprehensive theoretical and practical experience they are able to offer all industry a realistic approach to *any* weed or brush problem. These specialists have developed a variety of efficient weed and brush eradication programs over thousands of miles of line, roadside and right-of-way areas once choked and inoperable due to infestation.

With the right product—Amchem's tremendously diversified product line is your assurance that the right weed and brush killer is available and will be utilized for your specific problem. Weedone Brush Killers, for example, have been used in the field for years and proven eminently successful in eliminating weeds and brush wherever they are a problem. Why not bring your problems to Amchem?

Amchem and Weedone are registered trademarks of Amchem Products, Inc.

AMCHEM PRODUCTS, INC.
AMBLER, PA.

Please send me copies of your "Brush Control" brochure and full information on the uses of Weedone Brush Killers.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

AMCHEM

WEEDONE

BRUSH KILLERS

another chemical development of
Amchem Products, Inc.
(Formerly American Chemical Paint Co.)
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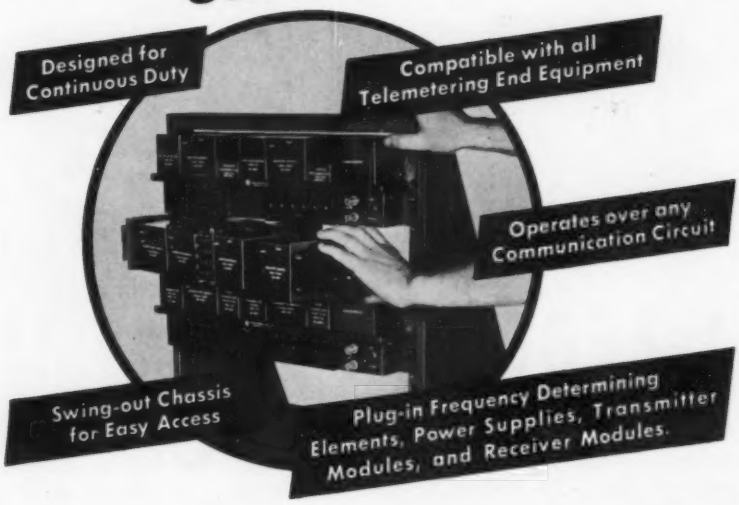
REMOTE INSTRUMENTATION & CONTROL

Comtel® Transistorized Modular Terminal Units for TELEMETERING and CONTROL APPLICATIONS


Designed for Continuous Duty
Compatible with all Telemetering End Equipment
Operates over any Communication Circuit
Swing-out Chassis for Easy Access
Plug-in Frequency Determining Elements, Power Supplies, Transmitter Modules, and Receiver Modules.

The Model 1220 and 1220A Carrier Terminals are completely transistorized and may be operated from station batteries from 12 to 130 DC. Plug-in power supply is available for 115-volt AC operation. All components, including amplifiers, frequency determining components, and power supplies are contained in plug-in modules, and may be readily interchanged. As many as 22 high-speed channels are available between 300 to 3000 cps.

MODEL 1220

The Model 1220 Terminals are normally used in telegraph applications and provide all necessary carrier and loop jack fields, as well as loop current controls. Two transmitters, two receivers, or a transmitter receiver are available on a single 5¼" .x 19" chassis. Operates from station battery or 117-volt AC line.

MODEL 1220A

The Model 1220A Terminals are normally used in telemetering and control applications. The individual modules are mounted on a swing-out chassis and are readily accessible. Four transmitters, four receivers, or two transmitter receivers are available on a single 3½" x 19" chassis. Operates from station battery or 117-volt AC line.

RFL REPRESENTATIVES:

ILL., MINN., IOWA, IND., WISC.
W. L. Cunningham, Elmhurst, Ill.
TEXAS, ARK., LA., OKLA.
Datatrol Co., Dallas, Texas
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Dickerson Eng., Jacksonville, Fla.
CALIFORNIA
Luscombe Engr., Pasadena, Calif.
ORE., WASH.
J. E. Edstrom, Portland, Ore.
CANADA
Microwave Sys., Scarborough, Ont.
FOREIGN
Telesco International, New York

SEND FOR TECH. DATA — For additional information, including application data, write or phone DE 4-3100. Demonstrations available by local representatives.

RFL Radio Frequency LABORATORIES, INC. Boonton, New Jersey, U. S. A.

a protective Zippertubing jacket that a man can zip on in a few seconds.

The Zippertubing is available in a wide range of materials, including Fiberglas, vinyl, Teflon, neoprene and polyethylene. The vinylized Zippertubing of Fiberglas or nylon cloth is described as providing excellent jacketing for outdoor applications. It is tough, pliable, mildew-proof, flame-resistant, and will stand up under severe weather conditions, the company says.

Zippertubing is supplied to users in tape form. A man simply wraps it around the wires to be protected so that the beading on both edges of the tape lines up, then zips it shut. Request NP1319.

•

AUDIO VOLUME INDICATOR — A new line of Audio Volume Indicators has been announced by Radio City Products Co., Inc.

The indicator has a three-position key on the front panel, which provides three circuit conditions, shown as follows:

Condition	Impedence In ohms	Sensitivity In V. U.	Accuracy In V.U.
1	7500	4 to 26	0.5
2	7500	24 to 46	0.5
3	600	–6 to 16	0.8

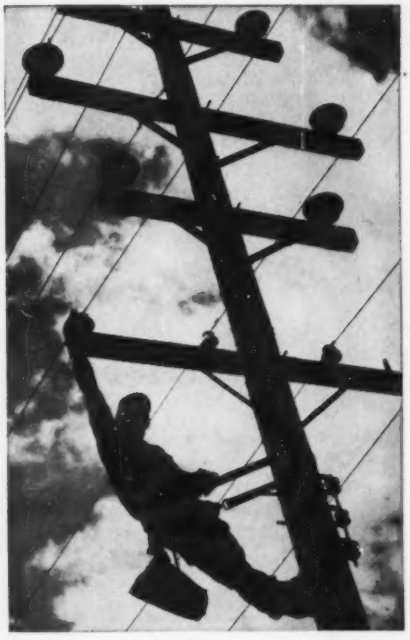
The basic instrument can be furnished in any one of four different configurations.

These units are utilized in measuring the level of speech and music in program line transmission systems. In addition to their application in telephone systems, the instruments can be included as part of industrial audio systems and in television and radio broadcast monitoring. Request NP1320.

•

BOOTHS—Burgess-Manning Co. has announced that its Model 45 "Hear-Here" Acousti-Booth is now being equipped with an internal mounting

How can you cut down on telephone pole maintenance?



String your lines with USS Tiger Brand Amertel 195.

When you use Amertel 195 to string your rural telephone lines, you get a real bonus. Much longer spans are possible—up to 700 feet. Fewer poles are needed; reducing the time and expense of pole maintenance per mile of line.

Amertel 195 has other important advantages too:

- Longer spans, fewer poles, means lower installation costs.
- Rivers, gullies, valleys, can be strung easily and economically.
- Amertel 195 withstands severe weather conditions, reducing service interruptions. It resists breakage even under heavy ice loads.
- The extra low resistivity of this quality wire assures improved voice transmission efficiency even at relatively high frequencies.

More information is given in our new booklet. For your copy, write to American Steel & Wire, Dept. 0221, 614 Superior Ave., N. W., Cleveland 13, Ohio.

USS, Tiger Brand and Amertel are trademarks

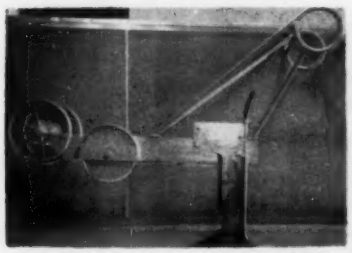
American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

RYAN'S HYDRAULIC CONTROLLED CABLE LAYERS AND REEL TRAILERS
—— ARE YOUR BEST BUY ——
THEY COST LESS TO OWN and LESS TO OPERATE

THE MODEL C FOR LARGE DEEP CABLE
(Now equipped w/two reel arbors)

THE COMB. REEL TRAILER & PLOW
for your wire and small cable job



AND THE NEW FRONT LAWN HAND PLOW
Winch it through yards and parks

With the Ryan patented slope back blade mounted close up to reel, you will lay wire and cable with less tension. The sharp cutting edge blade will pull easier and cause less surface disturbance. THERE IS NO USE MAKING SEVERAL TRIPS. Plow to the required depth in one pass with a RYAN Plow; you can do a better job and complete more miles per day.

IT'S THE CABLE PLOW WITH THE KNOW-HOW

There is fifteen years' experience built into the plows that are now working in all types of soil coast to coast and from Alaska and Canada to the Gulf. Repeat orders are proof of performance. ASK THE USERS.

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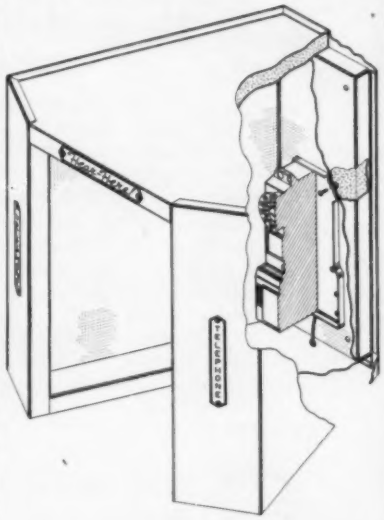
FAIRFIELD, IOWA

bracket for quick installing on coin telephones (see cuts).

The Acousti-Booth is designed for use in industrial plants and other locations where noise interferes with telephone conversations.



The company states that the Acousti-Booth reduces noise level by 97 per cent. The booth comes in both half-length and full-length sizes. Request NP1321.

•

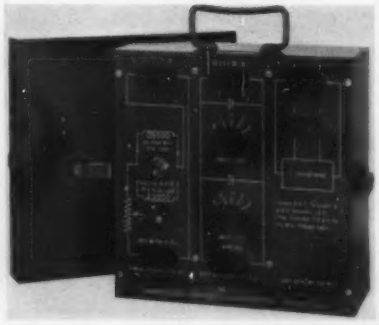
LOADED CABLE TESTS—The Communication Equipment & Engineering Co. has announced a new test set (C-100) which, it states, should not only make loaded cable acceptance tests practical, but also will aid in locating irregularities found to exist by such tests.

In announcing the new test set, CEECO states:

"There are many ways to determine if telephone cable loading has been correctly engineered and installed.

"One way that is gaining increasing unpopularity is to assume that everything is as it should be and try to get some usable gain from a negative impedance repeater. This 'method,' too, often results in quite a lot of consternation and a great deal of compromise.

"Similarly, loading can be applied to



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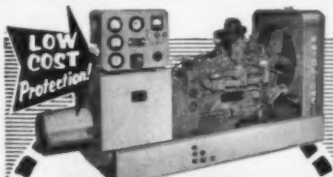

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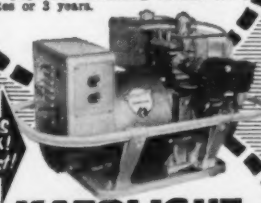
GASOLINE, GAS, DIESEL MODELS TO 500 KVA

We all agree it is good business to insure against unforeseen losses due to fire, wind or accident . . . but none is available to cover loss of time, inconvenience, discomfort, dangers that power failures bring. You're insured with Katolight Power Plants to keep your electrical equipment functioning whether for 3 minutes or 3 years.



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Crews have "plug-in" power at their finger tips when and where they want it. "Quick, steady power for operating elect..e saws, grinders, drills, hammers, heaters, sanders, paint sprayers. No delays. . . . No nuisance power line hook-ups. 500 to 35,000 watts and up.

BIGGER OVERLOAD CAPACITY.
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Katolight CORPORATION
Box 891-12 Mankato, Minnesota

cable circuits where repeaters will 'never' be applied, and, unless some sort of test is made, the ultimate transmission improvement provided by loading may not be realized.

"However, most loaded cable acceptance test methods have been unacceptable, because they have required too much time, too costly equipment and too much theorizing by the tester."

Included with the test set announced by CEECO are step-by-step instructions for testing and interpreting results.

A brief description of the set and its uses follows:

For making H88 loaded cable acceptance tests, the test set is connected as shown in *Fig. 1, page 102 (two test sets are required):*

Step 1. Compute 1,000 cps and 3,000 cps transmission loss of loaded cable. (Simple form included with test instructions). Subtract 1,000 cps loss from 3,000 cps loss. This gives *computed deviation.*

Step 2. Measure 1,000 cps and 3,000 cps loss with *Fig. 1* test arrangement. Subtract 1,000 cps loss from 3,000 cps loss. This gives measured deviation. If the impedance compensator (C-100 test set) is not used, reflection loss between the test equipment and the line will make the measurements uninterpretable.

In analyzing the tests, if *measured* deviation and *computed* deviation are within—

(1) 1 db, cable loading is nearly perfect.

(2) About 2 db, there are slight load coil spacing irregularities, but loading is acceptable for most applications.

(3) 3 db, or more, there is a major irregularity such as a missing coil, incorrectly installed coil or two coils where there should only be one.

This acceptance test can be made on a loaded cable count in a short time by measuring the 1,000 cps loss of one pair and then measuring the 3,000 cps loss of all pairs. If the 3,000 cps measurement gets out of line, there is reason to stop and investigate, CEECO states.

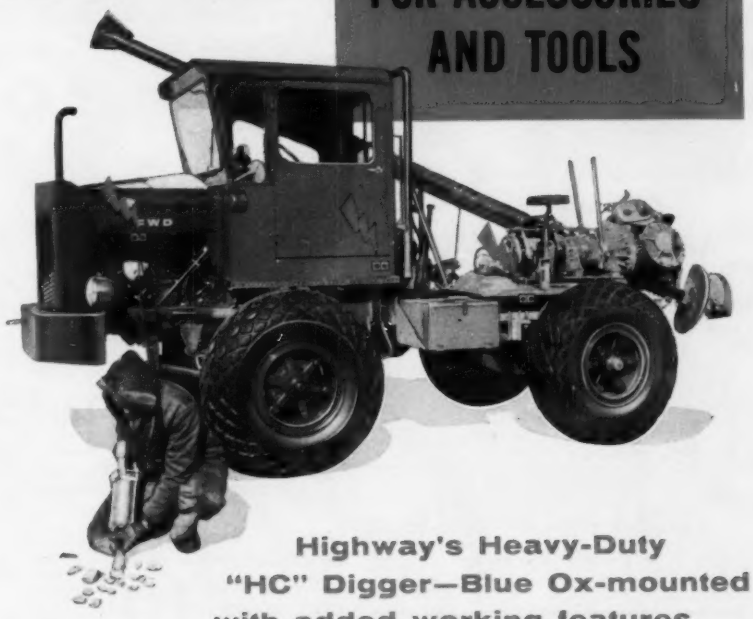
To investigate, the C-100 test set is connected as shown in *Fig. 2, page 102:*

This method relies on measuring "reflections" from the load coils in the cable. If the loaded cable pair is terminated in something other than the C115H balancing network, the termination, itself, will cause "reflections" and the results will be difficult, if not impossible, to interpret.

Step 1. With test arrangement shown in *Fig. 2,* vary the oscillator from 150 to 3,500 cps. Record peak and valley readings from the meter. (Forms are supplied with the C-100 test set instructions).

In analyzing the test, count the peaks or valleys in the recorded measurements. These peaks and valleys are the

DIGS HOLES
SETS POLES
plus
PORTABLE POWER
FOR ACCESSORIES
AND TOOLS



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The Highway "HC" earth-boring machine can be easily mounted on the "Blue Ox" vehicle or heavy-duty truck. The compact unit connects to the transfer case with a single drive shaft. Easily available controls allow one-man operation. Highway's exclusive telescoping derrick enables 75′ poles to be set. The "HC" machine digs holes from 9″ to 36″ in diameter, 20′ deep.

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Now you need not carry special generator units for "on the job" electrical power. Your Highway Generac unit gives you mobile power—mounted under the truck's hood and taking its power directly from the prime mover. This integral electrical generator gives you 110-120 AC current when and where you need it. Its uses are unlimited—see the picture above for an example. Write for complete information today!

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- Bring curbside pay stations to drivers.
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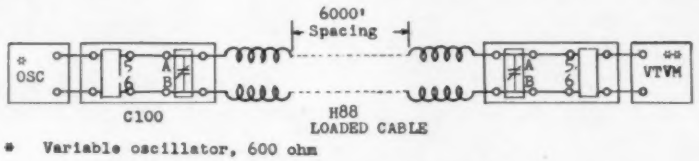
"*good*" load coils in the cable. The "bad," or irregular, load section is determined by adding *one* to the number of *peaks* or valleys.

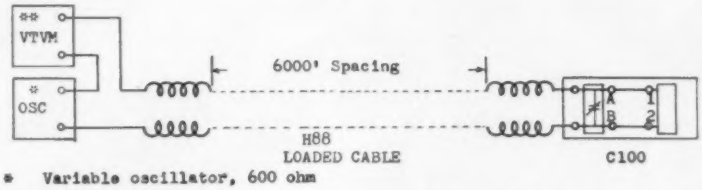
The C-100 test set instructions include tables and plots of circuits with missing load coils to assist in interpreting test results. Request NP1322.



* Variable oscillator, 600 ohm

** Vacuum tube or transistor voltmeter, 600 ohm.

Fig. 1



* Variable oscillator, 600 ohm

** Vacuum or transistor voltmeter, 600 ohm without coil imput.

Fig. 2

IN THE NATION'S CAPITAL

Continued from page 18

tell whether your ancestors were black, white, or Irish, and various other details of genealogy, both racial and geographical.

What happened in this case was that when Motherwell was taken into custody and informed that he was suspected of murdering an elderly lady, he professed to feel great shock. But immediately he claimed that he knew who had done the foul deed and gave his name, a mysterious missing man named "D'Avious." Motherwell spelled it out very carefully, with an apostrophe, giving an ostensible French or Italian appearance. He said the missing suspect looked like a Latin type.

The California police and the FBI were pretty sure that "Mr. D'Avious" was the little man who wasn't there, and the name was a phony. But how to prove it? A quick check of telephone directories produced no D'Avious or anything much like it. So Dr. Stewart was called in. As soon as he heard the name he said it was probably a fabrication because the spelling made it all wrong from the standpoint of natural language evolution of known family names. He speculated that Motherwell had taken a fairly common name, such as Davis or Davies, and had elaborated on it.

Anyhow, Dr. Stewart agreed to go to a lot of trouble and research to prove that such a name did *not* exist. His efforts took him through reference works, mostly telephone directories in every conceivable nationality with a heavy concentration on Spanish, Portuguese, and French. He examined telephone books from Paris, Brussels, Geneva, Madrid, Barcelona, Lisbon,

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Superior to vacuum type bottles for use on line crew and one man trucks. Particularly good for cold liquids as mouth opening is large for inserting cubes or chunks of ice.

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- Rugged plastic container will not corrode nor change taste or odor of contents.
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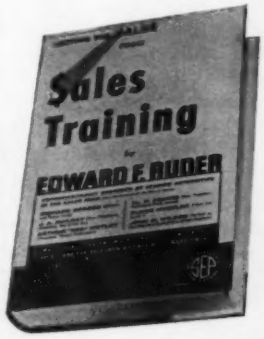
Here is a much-needed book on sales training for use by managers, department heads, superintendents, trainers, schools and libraries.

The newest training techniques are given practical application. Included are indoctrination, refresher and by mail training; memory, reading and speech improvement; and training supplements—sales contests, meetings, manuals, house organs, and new recruiting and hiring methods. This new book is enthusiastically endorsed by the top authorities—Arthur Motley, Pres., *Parade Publications;* Al Seares, V.P., Remington Rand; Elmer Wheeler, Consultant; John Wilson, Retired V.P. Sales, National Cash Register; J. McInay, V.P., Marketing, Ray-O-Vac; Richard Borden, Consultant.



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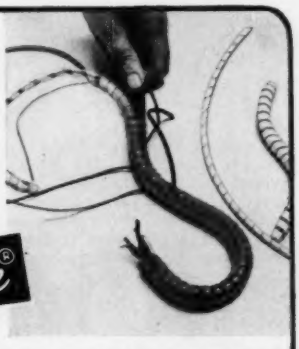
Bind Wires Fast... At Low Cost with Heli-Tube®



HELI-TUBE is a spirally-cut plastic tubing. Its shape-retaining characteristics make it ideal for binding electrical wires into cables. Wraps on like tape; holds wires together tightly; individual wires, taps, or lead-offs can be led out at any point. Earns cost back in time and labor-saving.

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- Clear for general applications
- Nylon — wide temperature range . . . very light weight
- Ultraviolet-Resistant
- Fire-Resistant
- Type 275°F (High-temperature)

Each form in three diameters:

- Instrument Size: 1/8" O.D. — for bundles up to 1/2" dia.
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- Giant Cable Size: 1/2" O.D. — for bundles up to 4" dia.

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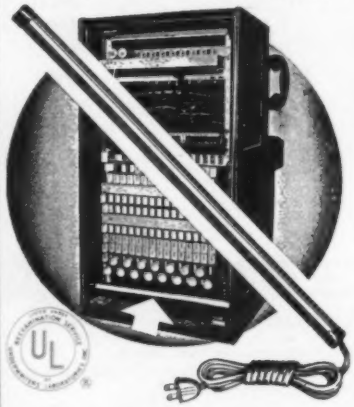

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Affiliate: DAMPP-CHASER, LTD. London, England

Milan, Florence, Manila, and the Latin American countries.

The FBI had already checked telephone books in the principal American cities, in addition to its own tremendous file of 315 million names! As close as Dr. Stewart could come to the alleged name of the mythical murderer was "Davios" (without the aspostrophe), an estimable Greek gentleman who was born on the Island of Tenos and now lives in New York.

Because of the nature of the case in which clews were very scarce and tenuous, Dr. Stewart's testimony was about the main reliance of the state in discrediting the alibi of the accused. But it worked. It gave this writer a new respect for the familiar telephone book. The good old telephone book has been used for many strange things, ranging from sitting little junior at the dinner table to underlying carpets, and even for purposes less polite. But this is the first time it has appeared as the handmaiden of the science of names, and an avenging instrument of justice.

The Case of the Disappearing Exchange Names

Incidentally, this discussion of names reminds this writer of a rather melancholy reaction to his perusal of a very learned article on new telephone numbers in the Bell magazine (Winter, 1959-60) written by the traffic facilities engineer of the American Telephone & Telegraph Co., William A. Sinks. The article was a very fine one, but it brought (to this writer at least) the sad news that names are gradually being abolished from telephone numbers because of a plan to reduce all numbers to 10-digit push button pattern. As a champion of the fondly recalled exchange names which are steadily disappearing in a cloud of numbers, your correspondent took pen in hand and asked for an explanation as to why the letters have to be replaced by numbers.

The explanation was a perfectly reasonable one. It appears there is no alternative to using numbers in the future. The people who do the deep thinking on such matters in the telephone company headquarters, say they felt just as badly as anyone else, about the eventual disappearance of some of the good old exchange names of happy memory—Stuyvesant, Algonquin, Butterfield or name your own favorite.

The trouble is that alphabetical letters are far less universally used than arabic numbers. With the tremendous international telephone traffic looming in the future and much international dialing, whose letters could be used? English? Greek? or that horrible conglomeration known as Cyrillic alphabet

through hot jungles or arctic cold or anywhere in the free world

GHO teams conquer terrain, weather and labor problems to lay cables and string lines in populated areas or desolate foreign soils . . . on schedule.

Highly trained men, fast-moving equipment and more than the usual amount of courage have gone into the successful completion of such jobs. These same skills are available to serve your requirements, too, whether the distance involves 100 feet or hundreds of miles, Gustav Hirsch Organization, Inc., is the most efficient service available.

which the Russians managed to concoct from the original classical Greek characters?

Yes, the telephone people have gone into this angle very carefully. And the answer seems to be in the direction of more numbers and less letters. Yet, that is the way the world is moving in this day of social security numbers, credit card numbers. The chances are the cashier at your bank pays more attention to the account number on your check than to your signature these days. Perish the thought, but the day may come when infants will be baptized by numbers instead of names, which might not be altogether a bad idea if the kids of the future do not get to spell any better than those of the present.

General of SW Gets Raises At 10 Texas Exchanges

The following rate increases became effective in Texas exchanges of General Telephone Co. of the Southwest during March:

	Old	*New*
Agua Dulce, Dial, 275 stations, Mar. 26.		
One-party business	$ 9.50	$11.50
Two-party business	8.00	9.50
One-party residence	5.25	6.00
Two-party residence	4.25	5.00
Four-party residence ...	3.50	4.25
Austwell, Dial, 54 stations, Mar. 1.		
One-party business	7.50	9.50
Two-party business	6.50	8.00
One-party residence	4.25	5.00
Two-party residence ...	3.50	4.25
Avinger, Dial, 191 stations, Mar. 6.		
One-party business	9.00	10.00
Two-party business	7.00	7.50
One-party residence	5.25	5.75
Two-party residence ...	4.25	4.75
Dickens, Dial, 54 stations, Mar. 6.		
One-party business	8.00	10.50
Two-party business	6.50	8.50
One-party residence	4.25	5.25
Two-party residence ...	3.50	4.25
Highlands, Dial—EAS, 1,450 stations, Mar. 6.		
One-party business	10.50	14.00
Two-party business	8.50	11.00
One-party residence	5.25	6.50
Two-party residence ...	4.25	5.50
Four-party residence ...	3.50	4.50
Smyer, Dial, 101 stations, Mar. 16.		
One-party business	8.00	9.50
Two-party business	6.50	—
One-party residence	4.50	5.25
Two-party residence ...	3.75	4.25
Somerset, Dial, 155 stations, Mar. 6.		
One-party business	9.00	10.00
Two-party business	7.50	—
One-party residence	5.00	5.50
Two-party residence ...	4.00	4.25
Tivoli, Dial, 119 stations, Mar. 6.		
One-party business	8.50	10.00
Two-party business	7.00	—
One-party residence	4.75	5.50
Two-party residence ...	4.00	4.50
Truscott, Dial, 51 stations, Mar. 6.		
One-party business	8.00	9.50
Two-party business	6.50	8.00
One-party residence	4.50	5.00
Two-party residence ...	3.75	4.25
Wylie, Dial, 644 stations, Mar. 21.		
One-party business	3.75	10.50
One-party residence	2.75	5.25
Two-party residence ...	—	4.25
Four-party residence ...	2.25	4.00

SO EASY TO HANDLE
WB Telephone Wires

Convenient, knockout cartons make WB Telephone Wires easy to handle in storage and on the job . . . protect the wire until it is used . . . Color-coded labels mean easy identification of wire types.

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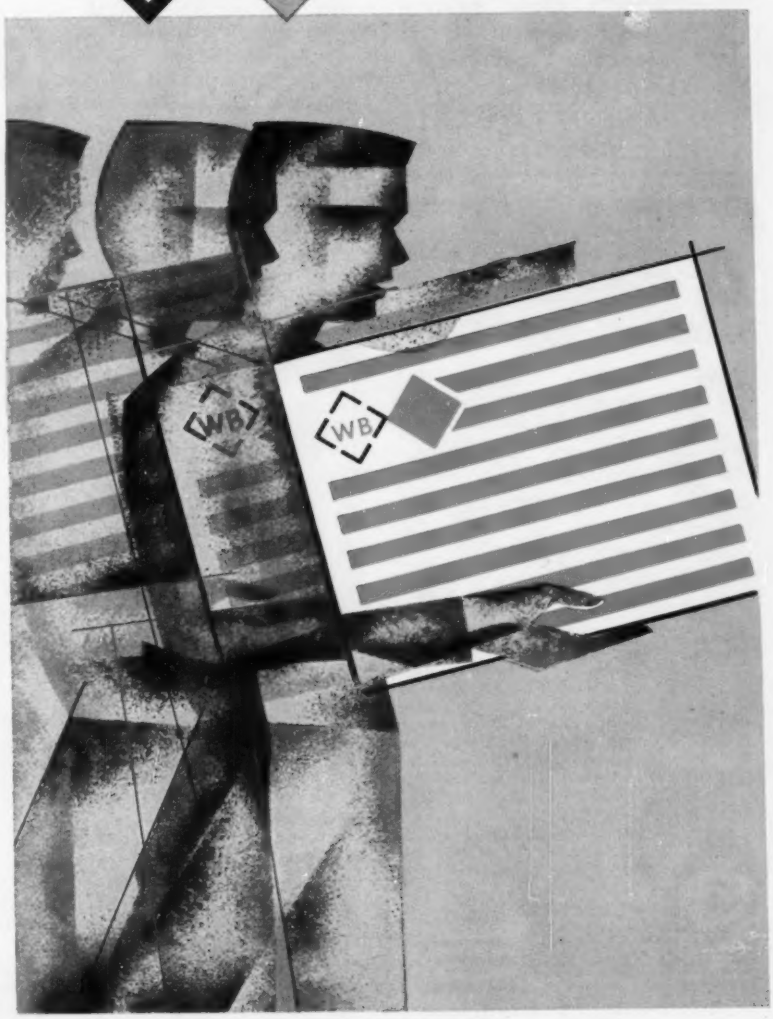
Telephone CHestnut 8-5515 / TWX: NH 84



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For their Operators, along with other stock items, from JOBBERS Listed As Distributors of Telephone Supplies on pages 49-50 of Telephony's 1959 Directory

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Mississippi Meet Reports State's Industrial Strides

By J. H. Creekmore*

THE PROGRESS that their state has made in the fields of transportation and communications was cited by Lt. Gov. Paul Johnson, speaking at the convention of the Mississippi Independent Telephone Association on Feb. 15. W. D. Bailey of Decatur, outgoing president, conducted the group's second annual meeting held in Jackson.

Lt. Gov. Johnson spoke on "Tremendous Progress in Mississippi," and said that "the state has welcomed technological help from other states and we now have a good competitive setup."

He continued, "Public sentiment within Mississippi has been for industrial growth in the past two decades, and for that reason, the state is on the threshold of tremendous industrial growth."

Other speakers at the convention were Norman H. McFarlin, assistant administrator of the Rural Electrification Administration, Clarence L. Lott, vice president and general manager of Southern Bell Telephone & Telegraph Co., and Thomas Hal Phillips, chairman of the Mississippi Public Service Commission.

Also on the program were discussions on IBM methods, direct distance dialing, and subscriber carrier and line concentrators.

A "Party Line Revue" was presented by a group from the East Central Junior College, Decatur.

Directors of the Mississippi association for the year 1960-61 are: W. W. Latham Jr. of Merigold; Lon J. Darley of Olive Branch; Bee Webb of Glen Allan; A. L. Young of Smithville and Harry N. Lackey of De Kalb.

Officers are: President, Mr. Darley; first vice president, Ed Creekmore Jr. of Calhoun City; second vice president, Harry Waller of Bruce; third vice president, Mr. Young; and secretary-treasurer, J. H. Creekmore of Louise.

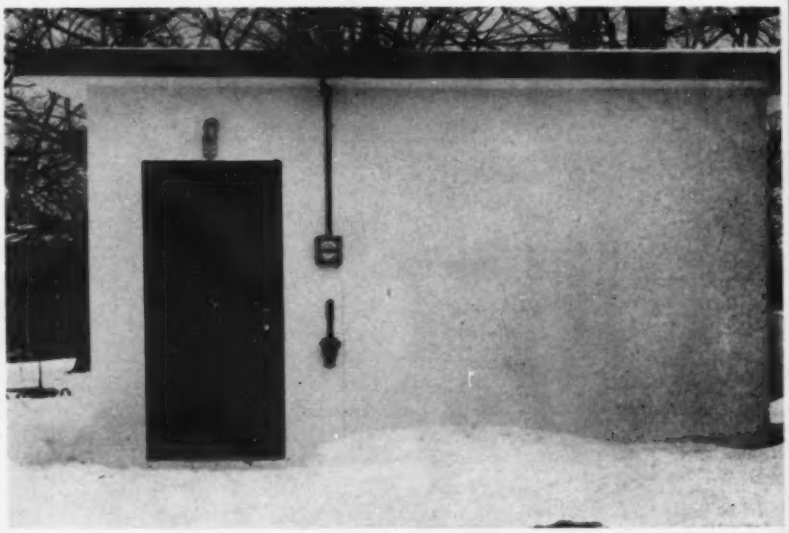
*Mr. Creekmore is secretary treasurer of the Mississippi Independent Telephone Association.

Pass Standby Telephone Excise Tax Bill in N. Y.

Governor Nelson Rockefeller has signed into New York law a bill to permit New York City and all counties outside it to take over the 10 per cent tax on telephone service if Congress allows a similar federal tax to expire July 1 (TELEPHONY, Mar. 5).

The proposed New York local taxes would be imposed by school authorities, which would use the proceeds for education. A total of 70 million dollars is potentially involved, of which 40 million dollars would be raised in New York City.

In New York City, imposition of the tax would require a majority vote of the Board of Education and a concur-



William H. Weppler, manager of Consolidated Telephone Co., Springfield, Me., recently was written up in a Maine newspaper as the man who "came to Lee, Me., from South Ashburnham, Mass., in July 1947 at a time when local telephone service was almost nil." Above is the new community dial office at Lee housing recently installed Leich dial equipment. The newspaper told how Mr. Weppler secured a $653,000 REA loan, and added to the Lee exchange, properties at Kingman, Winn, Mattawamkeag, Levant, Plymouth and Alton. The company now serves approximately 900 subscribers.

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CF&I Galvanized Steel Strand

Telephone lines are only as strong as the strand that supports them. For maximum service, in all climatic conditions, specify CF&I Galvanized Steel Strand. It's strong enough to hold the heaviest cable, yet pliable for easy installation. The zinc coating gives extra years of weather resistance.

CF&I Galvanized Steel Strand, available in 7 and 3-wire constructions, is made to ASTM specification A-122 when used as messenger and guy wire. Of course, CF&I manufactures strand to customers' own specifications. Your own distributor or the local CF&I sales office are ready for prompt handling of your orders. 7514

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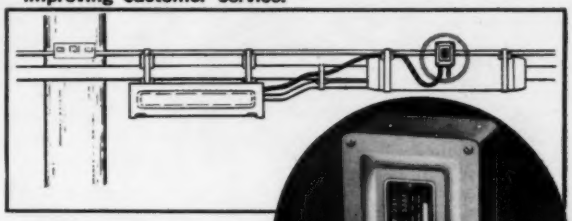
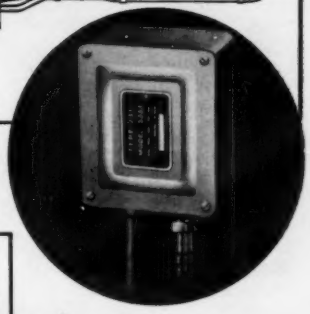
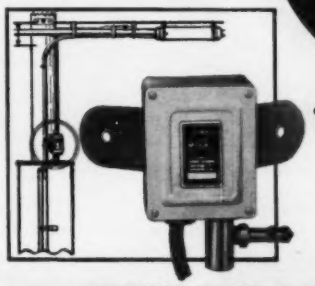
with U.E.'s improved, compact Pressure Guard as the proven aid for reducing cable maintenance costs and improving customer service.



Cable Mounted
TYPE J31-5333





Pole Mounted
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WHY A PRESSURE GUARD IS ESSENTIAL FOR MAXIMUM EFFICIENCY IN PRESSURIZED CABLE SYSTEMS

- The Pressure Guard monitors and protects cable at all times, not just periodically.
- The Pressure Guard ensures routine sheath breaks are detected and localized prior to service disruption.
- The Pressure Guard provides one more value that may be detected at the test desk.
- The Pressure Guard transmits its signals via working subscriber lines rather than requiring special circuits.
- The Pressure Guard reduces cable maintenance costs and improves customer service at very low cost.
- The Pressure Guard's low cost permits liberal usage for maximum protection.

SPECIFICATIONS

TYPE J31-5333

Field Adjustment Range	0 to 10 PSI
Factory Setting	2 ±¼ PSI on falling pressure
Pressure Response	4 ±½ oz.
Proof Pressure	30 PSI
Electric Rating	0.01 amp 100 V DC
Load Resistor	Carbon composition 270,000 OHM 1 watt

Drop Wire .....6′ Type SJO#18 stranded 2.0 conductor
Pressure connection: ⅛ NPT (⅛ x ⅛ elbow provided separately; usually not required with direct sleeve mounting).

TYPE J31-5338

Same as above with the addition of pole mounting provisions and 6′ of copper tubing.

Available through regular suppliers of telephone equipment. Contact them for new Type J31 Pressure Guard brochure. Catalogs covering other UE pressure, vacuum and temperature controls also available.

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UE

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ring vote by the City Council. Elsewhere throughout the state, school authorities could impose the tax without further authorization if school boards representing a majority of the public school pupils voted to do so.

Obituary

ROBERT D. BUZZARD, 59, vice president and controller of the General Telephone Co. of Pennsylvania, died of a heart attack on Apr. 16 in Erie.

He was also vice president and controller of the York (Pa.) Telephone & Telegraph Co.

Mr. Buzzard was born in Flora, Ore. and was a graduate of the University of Oregon.

From 1941 to 1945, he served as senior executive of accounts for the Federal Power Commission.

He joined the General System in 1945 as controller for General Telephone Co. of the Southwest.

In 1953, he became auditor, vice president and controller for General Telephone Co. of Pennsylvania. He had also been controller for the General Telephone Cos. of Ohio and Upstate New York.

Prior to that he had been auditor for the Delaware Valley Telephone Co., Johnstown, N. Y., and the Ohio Associated and Southwest Associated Telephone Cos.

R. D. BUZZARD

Mr. Buzzard had served the United States Independent Telephone Association as chairman of its accounting committee.

Survivors include his wife, Juanita S.; four children, Mrs. C. R. Wicks of Portland, Ore.; Mrs. John R. Tabb of Norfolk, Va.; Lt. Robert D. Buzzard Jr. of the U. S. Navy, Norfolk, Va.; and John R. Buzzard of Syracuse, N.Y.; 11 grandchildren and six brothers and sisters.

GT&E Announces Olsen, Burke Appointments

George E. Olsen has been named sales promotion supervisor for the General Telephone & Electronics Corp., according to announcement by R. Parker Sullivan, vice president-marketing and sales.

John Burke, formerly employe and

G. E. OLSEN

UNIVERSAL TURRET DERRICK
3 IN ONE UTILITY TOOL

- 3 mounting positions—left rear, right rear, behind cab.
- Full 360° horizontal arc sweep.
- 8,000 lbs. max. cap. (2,000 lbs. min.)
- 30' sheave height—sets up to 65' poles.
- High tensile steel in box-type boom for greater strength.
- Diggers **stows** with main boom, **digs** with either section. Digs close (12½') or far out (21'): an 8½' horizontal range of action.
- Controls built into base (Optional mountings available).
- Available with optional fiberglass basket for use as aerial lift.
- Conveniently adapts to all standard line bodies.
- Power digger stows—unstows **automatically.**

Before you buy! Compare these remarkable features for range, power and versatility. Truco/Denver—the **complete** turret derrick.

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community information supervisor with the public relations department of Sylvania Electric Products Inc., a subsidiary of GT&E, replaces Mr. Olsen as corporate relations and advertising assistant.

JOHN BURKE

In his new position, Mr. Burke will report to George P. Norton, vice president-corporate relations and advertising.

Mr. Olsen graduated from the University of Michigan with a BA degree in 1950, and later obtained a master of letters degree from the University of Houston.

He served with the public relations department of General Telephone Co. of the Southwest, San Angelo, Tex., prior to his transfer to GT&E's New York headquarters office in 1958.

Mr. Burke is a graduate of Brown University, with an AB degree in 1947, and later attended graduate school at Georgetown University.

He joined Sylvania's industrial relations department in 1955, and subsequently transferred to that company's public relations department.

India-Singapore Link

The Indian Ministry of Transport & Communications recently inaugurated radio-telephone service between the state of Madras and Singapore and also between Madras and London, England.

Make Haste Today

"Know the true value of time; snatch, seize, and enjoy every moment of it. No idleness, no laziness, no procrastination: never put off till tomorrow what you can do today."—LORD CHESTERFIELD.

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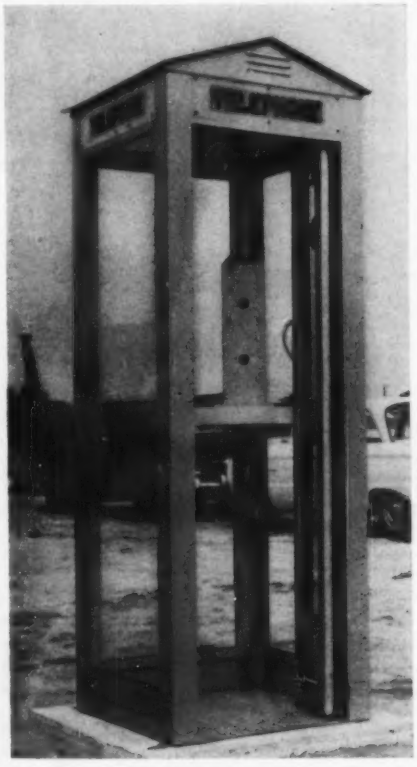

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RECONDITIONED SHERRON OUTDOOR TELEPHONE BOOTHS

- Reconditioned Baked Epoxy Aluminum Finish.
- One-Half Price of New.
- Wire Glass All Around.
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- Latest 40 Watt Circline Light Fixture.
- Paystation Mounting with Corner Shelf and Wire Ducts.
- Construction: Zinc Coated Cold Rolled Steel with Safety Plate Floor.
- Folding Door with Stainless Steel Track and Bronze Roller Bearing.
- Shipped All Assembled for Your Location.

Folks, the above Sherron Booths were in service several years and required refinishing or repairs. I purchased the lot and have really rebuilt the units like new. Refinished with the latest rust-resisting "Epoxy" Aluminum Paint baked on, New Signs and Light Fixture. A true Value at a great Saving. We will pay two-way freight if unsatisfactory. Have standardized on Aluminum finish to copy the Reynolds and Alcoa styling.

We have a limited quantity, but will accept orders for a future late shipping date. All shipments are F. O. B. our plant.

PRICE—MODEL 1 A, with Peaked Roof, as pictured..$195.00
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#C 50 A, 50 pr. group, new . . . $40.
reconditioned . . . . . 25.
C 52 A, 52 pr., new . . . . . 42.
reconditioned . . . . . 27.
C 25 A, 25 pr. (1/2 of C50), new 20.
1268 A, 20 pr., new . . . . . 10.
1268 B, 23 pr., new . . . . . 12.
1269 A, 20 pr., new . . . . . 10.
1435W (1269-A-wood base), new 10.
1435 U, Fuse group, new . . . . . 5.
Heat Coils. 76A, new . . . . . 10¢
Frames, MDF, W.E. & Cook
6 & 8 ft., single or up to 5 verticals in unit—save over half.
FUSES, 35A, B, C, H, S, New, 10¢. ($9 hund., $80 thousand) 75,000 in stock (standard W.E. pack, 10 or 50)

OPEN WIRE PROTECTION

WE #83A (#84A in wp. mtg. box, 5 pr. block equipped with #26 & #30)
New $5.00—Reconditioned $4.00

"KICK-COILS"

(CB phones to LB SWBD)

KELLOGG

C-111

Ring-thru, 4 section (50 ohms each) 1:1 ratio. Ideal for connecting CB phones to Mag. board using common battery supply.
Also may be used for ring-thru LB cord circuits, isolation, drainage.
New $1.50—Used $1.00

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(new)

W.E. 77A (subsitute) C-161 . $ 3.50
76A (two coils) 1:1 rat. 5.00
75A (better matched) . 6.00
91A (double coil) 10.00
93A, B, F, G 12.50
70A ring-thru 5.00
27A non-ring-thru 3.00
25A two of above 5.00
94E non-ring-thru 2.50
94G 3.50
94H 5.00
101A 5.00
120C, CS, E, ES 5.00
Retard coils, 149E 3.00
Kellogg—New
20A Repeating $2.00
19A Repeating 2.50

Pole Terminals, with lead Stub

W.E. F-10, 5½ ft. stub . . . . . $ 6
12 ft. stub 7
F-16, 5½ ft. stub 10
12 ft. stub 12
F-26, 5½ ft. stub (4 for $50) ea. 15
BD-102, cross-conn 51 pr. or terminal 102 pr. 80
BD-606, as above 250
B26, with Cook #105 fused 20 pair protector 30
Cook XB11 with 6 ft. stub 6

A.E. 60A type, 16 pr., 6' stub . . $ 8
26 pr., 6' stub 12

Protected Pole Terminals.

11 pair S-6 Cook, A9—5 amp. Fuses—Tru-gap Dischargers. No stub, for Plastic cable, compression gland. New $19.50

Protected Interior Terminals.

Western Electric—all new. Lead stubs.

LA 11, complete $40
LA 16, complete 50
LA 26, complete 65
LA 26 (fuse chamber only) 20
with protection 30
LA 51, complete 100
LB 26, fuse chamber only 20
with protection 30
LC 16, complete 45
LC 26, complete 60
LC 51, complete 80

Interior, lead stub

W.E. G-16, bind post chamb. 5
G-26, bind post chamb. . . . 10
H-51, bind post chamb. . . . 20
(12 ft. stub)
E-51, 54" stub 25
50 ft. stub 40

Cook Terminals

WXB, 6 pr. (less box) Lead 4
WXB, 16 pr. (with box) 8
M-16, 51 pr. 15
Uniflex, 51 pr. 15
Cable vault, 101 pr. 50
(with H-20 protectors) 100
Terra-Term, 76 pr. 35

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Western Electric #12—NEW

3 position, 15 cord (Universal) equipped 160 CB, 40 LB lines with 2 appearances, all lamp equipped 105C Power unit, line relays & trunk equipment available as needed.

KELLOGG C.O. Positions (like new) #258 jacks, #25 lamp jacks. Power board, line & cut-off relays, trunk equipment complete on racks. (Circuit details on request.)

Huge stock of New (also good used) Jack & Lamp strips, W.E., Kellogg, St. Carl. Line & Cutoff relays, trunk equipment. Cords & Plugs.

PBX Boards—cord & cordless.
New & rebuilt, many types.

TEST BOARD EQUIPMENT, W. E.

Jack fields, mountings: #230, 231 A & B, #184, 185, etc.

Jacks: 410A, 218, 219, 220, 239, etc.

Patch cords — Test cord plugs.

MDF & Terminal test plugs & shoes.

Hybrid repeating coils.

Complete WE Toll Test Boards.

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TRAFFIC ENGINEER—must be experienced in traffic problems, ordering and engineering. Please send complete résumé or telephone R. G. Whitmore, National Scientific Laboratories, Inc., 2010 Mass. Ave., N.W., Washington, D. C. Telephone: HUdson 3-4030.

SWITCHMAN—Must be fully qualified to maintain step equipment. Good wages and opportunities for advancement with rapidly growing telephone company. Reply sending complete résumé to C.O.E. Supervisor, Box 705, Ft. Walton Beach, Fla.

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TELEPHONES—all types—any condition, candlesticks, wall sets, etc. Write advising quantities available. Our trucks will pick up. Reply to Box No. 3952, c/o TELEPHONY.

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DISTRIBUTION, SAME AS ABOVE, (BLACK. NOT COLOR CODED) @ $55.00 per M. ft.

DROP WIRE. NEOPRENE, COPPER WELD CONDUCTORS, 90 or more Feet per run. Each run separate coiled, @ $11.00 Per M. Ft.

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(RECONDITIONED)

#280953	Concentric 25 x 500 ohms
#281637	Concentric 250 x 1000 N.I. ohms
#281721	Concentric 32 x 550 ohms
#281415	19/32" Armenture Eng Slug Concentric 1000 x 1000 ohms
#280028	Single Wound 1300 ohms
#280712	Concentric 50 x 200 ohms
#280026	Tandem 200 x 200 ohms
#280208	Single Wound 1000 ohms
#280197	Tandem 1000 x 1000 ohms
#281057	1" Heel End Slug 1000 ohms
#280050	Single Wound 500 ohms
#D-9944-C	Polarized Relay
#D-281596	Repeating Coils

(*) Specify Spring Combination Required for each Relay. Relay Covers are available for above. Mounting Plates for 10 Relays for 19" A.E. Racks. Many other coils also available.

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DIA Field Wire: All NEW Signal Corps Telephone Wire. 4 Copper, 3 Steel Strands per Conductor. Plastic & tough Nylon Jacketed, TWISTED PAIR. For Drop, Emergency, Etc. On 1 Mile Reels.
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PRICE .....$39.50/M Ft. DELIVERED ! !

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A.E. Type #40 Monophone, Desk Handset, Complete AS IS OUT OF SERVICE with Synchronomic (16, 30, 42, 54, 66 Cycle) Ringers @ SPECIAL PRICE.....$2.50 Each DIAL BLANKED WITH DIAL—$3.50 Each.

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LEICH #901 or S.C. #1248 Magneto Telephones, with NEW KOILED KORDS—FULLY RECONDITIONED .....$16.00 Each.

AS IS OUT OF SERVICE—Complete, $14.00 Each.

TERMS: 1% 10 Days, Net 30; FOB DESTINATION on Wire & Cable. FOB Warehouse on Telephones.

RURAL Distribution & Plastic Jacketed Cables, Neoprene Drop Wires. All Makes of Telephones and Hardware also IN STOCK!

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19/ 26 pr	Paper & Lead	1396	300.00 M
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19/101 pr	Paper & Lead	397	1.25 ft.
22/ 11 pr	Plastic	3153	100.00 M
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19/ 18 pr	Plastic	600	295.00 M
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22/ 6 pr	Textile & Lead	8000	70.00 M
22/ 11 pr	Textile & Lead	13748	90.00 M
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22/ 16 pr	Rubber & Lead - Neo Jacket	1059	200.00 M
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Index to ADVERTISERS

	Page
Acme Electric Corporation	—
Acme Visible Records, Inc.	33
Airtronics International Corp.	—
Alphaduct Wire & Cable Co., The	52
Altec Lansing Corp.	90
Aluminum Company of America	—
Amchem Products, Inc.	97
American Chain & Cable Co., Inc. Page Steel & Wire Div.	—
American Electrical Heater Co.	—
American Steel & Wire Co.	99
American Telephone & Telegraph Co.	14-15
Anaconda Wire & Cable Co.	—
Ansonia Wire & Cable Co., The	46
Arps Corporation	92
Arrow Fastener Co., Inc.	93
Atlantic Creosoting Co., The	113
Audio Development Company	—
Automatic Electric Sales Corp.	12-13, 41, 56-57
Baker Wood Division	—
Barber Advertising Specialties, Walt	—
Bell & Co., J. A.	50
Bell Telephone Laboratories, Inc.	—
Benner-Nawman, Inc.	—
Berry & Co., L. M.	34-35
Bethlehem Steel Co.	—
Bishop Manufacturing Corp.	54
Bohnsack Equipment Co.	110
Brand, Wm.—Rex Div.	67
Brown Mfg. Co.	91
Brown Wood Preserving Co.	—
Buckeye Telephone & Supply Co.	95, 112
Buchart Associates	—
Budelman Electronics Corporation	72
Burgess-Manning Company	103
Burroughs Corp.	115
Butler Manufacturing Co.	—
B. Y. Dial Service	110
C&D Batteries, Inc.	61
Cabaniss-Pogue Co.	110
Cable Construction Co.	109
Cable Spinning Equipment Co.	92
Calculagraph Company	—
Cereske Co., William	113
Chance Co., A. B.	89
Charles Machine Works, Inc.	—
Chicopee Mills, Inc.	103
Cleveland Inst. of Electronics	—
Clifton Appraisal Co.	110
Coil Winders	102
Collins Radio Co.	—
Colorado Fuel & Iron Co., The	107
Commercial Cord Company, Inc.	68
Communication Equipment & Engineering Co.	71
Comptometer Corporation	—
Consolidated Electrodynamics Corp.	—
Cook Electric Company	59
Copperweld Steel Co.	16
Crane, Inc., Carl C.	110
Cushman Motor Works, Inc.	—
Dahl Co., Inc., George W.	87
Dampp-Chaser, Inc.	104
Danish Import	112
Davis Construction Co.	—
Davis Manufacturing Co.	63
Dial Haven, Inc.	113
Diamond Expansion Bolt Co.	—
Dierks Forests, Inc.	93
Dillon & Co., Inc., W. C.	—
Donnelley & Sons, R. R.	—
Duo-Safety Ladder Corp.	91
E. & C. Contracting Co.	109
Electric Specialty Co.	—
Emhart Manufacturing Company	39
Essco Products	94
Everstick Anchor Co.	100
Exide Industrial Division— The Electric Storage Battery Co.	49
Fitchburg Engineering Corporation	—
Floor-Con	76
Fodness and Associates	110
Foley Construction Co., Robert E.	110
Ford Co., T. A.	102
Ford Motor Company, The	—
Gagne Enterprises, Inc.	76
General Cable Corporation	—
General Insulated Wire Works	—
General Machine Products Co., Inc.	74
General Telephone Directory Co.	116
Gladwin Plastics, Inc.	70
Gould-National Batteries, Inc.	—
Graybar Electric Co.	—
Haley & Co., R. G.	—
Harris-McBurney Company	—
Henkels & McCoy	109
Highway Trailer Company	101
Hirsch Organization Inc., Gustav.	104
Holan Corp.	31
Indiana Steel & Wire Co.	88
Johns-Manville	—
Katolight Corporation	100
Kearney Co., Jas. J.	73
Kellogg Switchboard & Supply Co.	44-45
Kennecott Wire & Cable Div.	—
Keystone Steel & Wire Co.	60
Killoren Company	100
Klein & Sons, Mathias	72
Kohler Co.	85
Koiled Kords, Inc.	—
Koppers Co., Inc. Wood Preserving Div.	113
Leich Sales Corporation	6-7, 27, 28
Lindsay Telephone Supply Co.	109
Line Equipment Sales	112, 113
Lorain Products Corp., The	5
Magnolia Chemical Co., Inc.	108
McCabe-Powers Body Company	69
McGrath Engineering, Inc.	110
Minnesota Mining & Manufacturing Co.	75
Monsanto Chemical Co.	—
Organic Chemical Co.	—
Plastics Div.	—
Morrison-Pelsue Co.	74
Murphy Engineering Laboratories	110
Natco Corporation	100
National Pole & Treating Div.	—
National Standard Co.	—
National Telephone Supply Co.	—
Neubauer Mfg. Co.	—
Neuses, Inc., P. K.	113
Newman Corporation, M. M.	103
North Electric Company	10-11
Okonite Company, The	—
Onan & Sons, D. W.	—
Orangeburg Manufacturing Co., Inc., Div. of The Flintkote Co.	—
Osmose Wood Preserving Co.	96
Owens-Illinois	—
Page & Hill, Inc.	—
Panhandle Electric Sales, Inc.	—
Penta Wood Products, Inc.	113
Phelps Dodge Copper Products Corp.	8-9
Philco Corporation Gov't & Industrial Div.	—
Plastic Wire & Cable Corp.	—
Plastimayd Corporation	—
Porter, Inc., H. K.	96
Power Unit Sales Co.	—
Prairie Implement Co.	102
Preformed Line Products Co.	77-84
Puregas Equipment Corp.	—
Radio Frequency Labs, Inc.	98
Railway Communications, Inc.	—
Ramset Fastening System	—
Raytheon Company	—
Recordak Corp.	—
Reichhold Chemicals, Inc.	—
Reliable Electric Company	43
Republic Creosoting Company	—
Rohn Manufacturing Co.	—
Rolatape, Inc.	—
R-P Corporation	53
Runzel Cord & Wire Co.	—
Ryan Mfg. Co., F. B.	99
S & G Manufacturing Co.	66
Schauer Mfg. Co.	88
Seymour Smith & Son	86
Sherron Metallic Corp.	51
Sierra Electronics Corp.	55
Sloan, Cook & Lowe Co.	110
Stainless, Inc.	—
Stampings, Inc.	66
Stewart Bros.	—
Stromberg-Carlson Co.	2-3
Studebaker Packard Corporation	—
Superior Cable Corporation	94
Suttle Equipment Corporation	—
Tanner Co., O. C.	112
Taylor-Colquitt Co., The	—
Telectric Co.	111
T.E.I. Corp.	110
Tele-Muff Co.	106
Teletype Corporation	—
Tele-Wire Supply Co., Inc.	113
Templeton, Kenly & Co.	106
Thornhill Publishing Co.	—
Trailways Bus System	37
Transandean Associates, Inc.	62
Truck Equipment Company	108
Tudor & Yager, Inc.	110
Union Carbide Plastics Company	—
United Electric Controls Co.	107
U. S. Industrial Chemicals Co.	—
United States Instrument Corp.	—
United States Motors Corp.	—
United States Steel Corp. American Steel & Wire Co.	99
Creosote Division	—
Universal Controls Corp.	—
Utility Equipment Co.	—
Utility Service Co., Inc.	58
Utility Tool & Body Co.	—
Warren Mfg. Co., The	—
Weikel Line Company	112
Western Electric Co.	—
Whitney-Blake Co.	65, 105
Williams Inspection Co., Inc., A. W.	110
Winders & Geist, Inc.	86
Wiremold Co., The	64
Wyoming Valley Equipment Div.	—
York-Hoover Corporation	47

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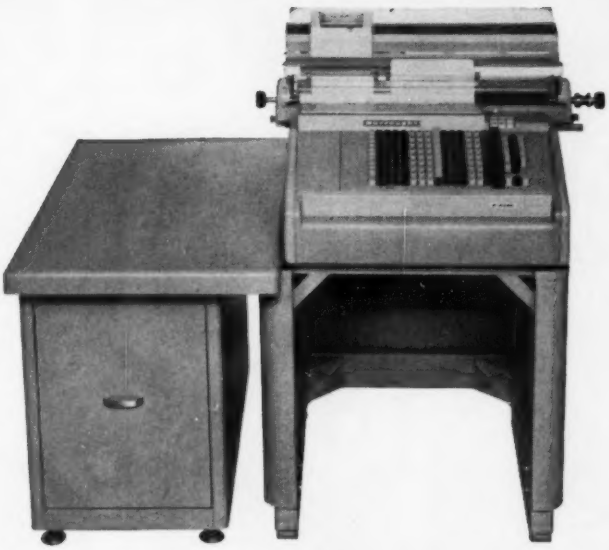

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